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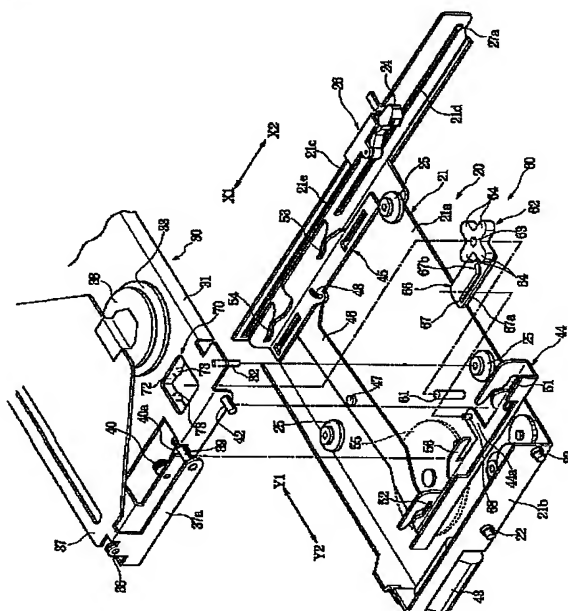
(54) 【発明の名称】 記録媒体の駆動装置

(57) 【要約】

【課題】 駆動ユニットがベース上で弾性部材を介して支持されているものでは、駆動ユニットに対して記録媒体であるディスクを出し入れするときに駆動ユニットを拘束することが必要である。ただし、この拘束手段は構造が複雑であり、しかも多方向を拘束する構造とするのが困難である。

【解決手段】 昇降ベース21上にダンパー25を介して駆動ユニット30が弾性的に支持されている。拘束手段60では、昇降ベース21に十字形状の回転体62が設けられ、駆動ユニット30に貫通穴70が形成されている。回転体62が貫通穴70に挿入された状態で、第1の切換え部材44によって回転体62が45度回転させられると、回転体62の十字形状の拘束部64が貫通穴70の各内壁に加圧されて、駆動ユニット30がX方向とY方向へ拘束される。

図2



【特許請求の範囲】

【請求項1】 記録媒体への記録または記録媒体からの読み取りを行う駆動ユニットが、ベース上に弾性部材を介して支持されており、且つ前記駆動ユニットに記録媒体を装填するときおよび／または駆動ユニットから記録媒体を排出するときに前記駆動ユニットを前記ベース上で拘束する拘束手段が設けられている記録媒体の駆動装置において、

前記拘束手段は、前記駆動ユニットとベースのいずれか一方に設けられた貫通穴または非貫通の窪み部と、他方に設けられて前記穴または窪み部内に入る回転体と、前記回転体を回転させる回転駆動手段とを有し、

前記回転駆動手段により、前記回転体は、少なくとも1箇所が前記穴または窪み部の内壁に当たってベース上で駆動ユニットを拘束する拘束位置と、前記回転体が前記内壁から外れる拘束解除位置とに回転切換えされることを特徴とする記録媒体の駆動装置。

【請求項2】 前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の少なくとも2箇所に当たって、ベース上での駆動ユニットの動きが異なる2方向へ拘束される請求項1記載の記録媒体の駆動装置。

【請求項3】 前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の対向する2箇所に当たって、ベース上での駆動ユニットの動きが相反する2方向へ拘束される請求項1記載の記録媒体の駆動装置。

【請求項4】 前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の少なくとも3箇所に当たって、ベース上での駆動ユニットの動きが、回転体の回転軸と直交する平面上での全ての方向へ拘束される請求項1記載の記録媒体の駆動装置。

【請求項5】 前記拘束位置に回転した前記回転体の少なくとも1部が、前記穴または窪み部の内壁を、前記回転体の回転軸と平行な方向へ拘束し、ベース上での駆動ユニットの動きが、前記回転軸と平行な方向へ拘束される請求項1ないし4記載の記録媒体の駆動装置。

【請求項6】 前記記録媒体がディスク状であり、前記駆動ユニットには、前記ディスク状の記録媒体を回転させる回転手段と、回転する記録媒体に対向しまたは接触するヘッドとが設けられている請求項1ないし5のいずれかに記載の記録媒体の駆動装置。

【請求項7】 前記駆動ユニット上には、ディスク状の記録媒体の中心部を前記回転手段へ保持させるクランプ手段が設けられ、前記クランプ手段を駆動する駆動手段が前記回転駆動手段を兼用し、この駆動手段によって前記クランプ手段が記録媒体を保持する状態に設定されるときに、この駆動手段によって前記回転体が拘束解除位置へ回転させられる請求項6記載の記録媒体の駆動装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、ディスク状などの記録媒体が装着や排出されるときに、駆動ユニットを拘束し、記録媒体の記録や読み取りが行われているときに、駆動ユニットを弾性状態で支持する記録媒体の駆動装置に関する。

【0002】

【従来の技術】図11(A)(B)は従来の車載用の記録媒体の駆動装置の一例としてディスク装置を動作別に示す側面図である。

【0003】このディスク装置では、装置内に装填されるマガジンM内に複数のトレイトTが引出し自在に設けられ、個々のトレイトT上にディスクDが載置されている。前記マガジンMの装填位置に対向する駆動ユニット1には、ドライブシャフト2とこのドライブシャフト2に軸7を介して回転自在に支持されたクランプアーム5とが設けられている。

【0004】ドライブシャフト2には、回転テーブル3とこの回転テーブル3を回転駆動するスピンドルモータ4、および光ヘッドが搭載されている。また前記クランプアーム5にはクランパ6が回転自在に支持されている。

【0005】このディスク装置では、駆動ユニット1が図示上下方向へ移動することによりマガジンM内のいずれかのトレイトTが選択される。駆動ユニット1がトレイトTを選択した位置で停止した状態では、図11(A)に示すように、クランプアーム5が上方へ回転し、マガジンM内から選択されたトレイトTが駆動ユニット1に向けて引き出され、トレイトT上のディスクDの中心がクランパ6により回転テーブル3上にクランプされる。ディスクDの駆動が完了すると、空のトレイトTが駆動ユニット1上に引き出され、トレイトTがディスクDの下に至ると、クランプアーム5が上昇しクランパ6がディスクDから離れてディスクDのクランプが解除され、自由状態のディスクDがトレイトT上に載置されてマガジンM内に戻される。

【0006】

【発明が解決しようとする課題】前記ディスク装置を車載用として使用する場合、図11(B)に示すように駆動ユニット1にディスクDが装填されて駆動されているときに、ダンパなどの弾性部材8で駆動ユニット1を弾性的に支持しておくことが必要である。このように駆動ユニット1を弾性支持しておくことにより、車体振動が与えられたときにこの振動がディスクDの駆動動作に悪影響を与えるのを防止できる。一方、図11(A)に示すように、マガジンM内からディスクDを引き出すときには、ディスクDの中心を回転テーブル3上に位置決めできるように導くことが必要であり、また回転テーブル3上のディスクDをマガジンM内に戻すときには、ディスクDをマガジンM内の所定の位置へ正確に導くことが必要である。そのためには、弾性部材8で支持されてい

る駆動ユニット1のドライブシャシ2を拘束することが必要である。

【0007】前記のように駆動ユニット1へのディスクDの導入および排出の際にドライブシャシ2を拘束する拘束手段として、従来は拘束レバーなどを駆動ユニット1の外側に配置し、この拘束レバーを進行させまたは回転させてこの拘束レバーをドライブシャシ2に掛止させて駆動ユニット1を拘束するものが一般的であった。

【0008】しかし、前記の拘束レバーを駆動ユニット1の外側に配置すると、駆動ユニット1の外側に前記拘束レバーを動作させる領域を確保しなくてはならないため、駆動ユニット1の周囲での他の部品の配置を制約し設計の自由度が低下するという欠点がある。

【0009】また、拘束レバーを駆動ユニット1の外側で進行させまたは回転させてドライブシャシ2に掛止させるものでは、1個の拘束レバーで駆動ユニットを一方方向へしか拘束できない。したがって、駆動ユニット1を各方向へ拘束するためには、駆動ユニット1の周囲を囲むように多数の拘束レバーを配置しなくてはならず、駆動ユニット1の周囲の部品点数がさらに多くなる。また、拘束レバーの数を減らすと、拘束レバーをドライブシャシ2に掛止させたときに、拘束レバーによって駆動ユニット1がいずれかの方向へ押されて、駆動ユニット1の位置がずれ、マガジンMに対して駆動ユニット1を正確に位置決めできない問題が生じる。

【0010】本発明は上記従来の課題を解決するものであり、駆動ユニットの外部へ機構を大きく突出させることなく、駆動ユニットを拘束できるようにし、駆動ユニットの周囲のスペースを制約することのない記録媒体の駆動装置を提供することを目的としている。

【0011】また本発明は、1つまたは少数の拘束手段で、駆動ユニットを多方向へ拘束できるようにして、駆動ユニットを各方向へ安定して拘束できるようにした記録媒体の駆動装置を提供することを目的としている。

【0012】

【課題を解決するための手段】本発明は、記録媒体への記録または記録媒体からの読み取りを行う駆動ユニットが、ベース上に弾性部材を介して支持されており、且つ前記駆動ユニットに記録媒体を装填するときおよび／または駆動ユニットから記録媒体を排出するときに前記駆動ユニットを前記ベース上で拘束する拘束手段が設けられている記録媒体の駆動装置において、前記拘束手段は、前記駆動ユニットとベースのいずれか一方に設けられた貫通穴または非貫通の窪み部と、他方に設けられて前記穴または窪み部内に入る回転体と、前記回転体を回転させる回転駆動手段とを有し、前記回転駆動手段により、前記回転体は、少なくとも1箇所が前記穴または窪み部の内壁に当たってベース上で駆動ユニットを拘束する拘束位置と、前記回転体が前記内壁から外れる拘束解

除位置とに回転切換えられることを特徴とするものである。

【0013】本発明では、駆動ユニットまたはベースに設けられた穴または窪み内で回転体が回転することによって、駆動ユニットの拘束と拘束解除が行われる。そのため、拘束手段を構成する機構部品を、駆動ユニットの外周でベース上に配置する必要がなく、駆動ユニットの外周でのスペースの有効利用ができる。

【0014】また本発明での、前記穴は、四角形や三角形に開口するもの、または1辺が駆動ユニットの縁部に開口した切欠き形状の穴であってもよい。

【0015】例えば、図10に示すように、前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の少なくとも2箇所に当たって、ベース上での駆動ユニットの動きが異なる2方向へ拘束されるものにできる。

【0016】あるいは、図9に示すように、前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の対向する2箇所に当たって、ベース上での駆動ユニットの動きが相反する2方向へ拘束されるものであってもよい。

【0017】さらには、図3に示すように、前記拘束位置に回転した前記回転体が、前記穴または窪み部の内壁の少なくとも3箇所に当たって、ベース上での駆動ユニットの動きが、回転体の回転軸と直交する平面上での全ての方向へ拘束されるものであることが好ましい。

【0018】また、図7に示すように、前記拘束位置に回転した前記回転体の少なくとも1部が、前記穴または窪み部の内壁を、前記回転体の回転軸と平行な方向へ拘束し、ベース上での駆動ユニットの動きが、前記回転軸と平行な方向へ拘束されるように構成することも可能である。

【0019】本発明では、前記記録媒体がディスク状であり、前記駆動ユニットには、前記ディスク状の記録媒体を回転させる回転手段と、回転する記録媒体に対向しまたは接触するヘッドとが設けられているものに好適である。

【0020】ただし記録媒体は、ディスク状以外の例えばカセットテープ、ICパッケージなどであってもよい。

【0021】また、前記駆動ユニット上には、ディスク状の記録媒体の中心部を前記回転手段へ保持させるクランプ手段が設けられ、前記クランプ手段を駆動する駆動手段が前記回転駆動手段を兼用し、この駆動手段によって前記クランプ手段が記録媒体を保持する状態に設定されるときに、この駆動手段によって前記回転体が拘束解除位置へ回転させられるものとすることができる。

【0022】上記のように、回転体を回転切換えるための回転駆動手段として、他の機構を動作させる駆動手段と兼用することにより、回転体を回転させる専用の駆動手段を設けることが不要になる。

【0023】

【発明の実施の形態】図1は本発明のディスク装置を示す側面図、図2は昇降ベースとその上に支持された駆動ユニットを示す斜視図、図3は駆動ユニットの平面図、図4(A)(B)(C)はディスクのクランプ動作を示す動作別の側面図、図5(A)(B)は回転体が拘束位置と拘束解除位置に回転切換えされた状態を示す部分平面図、図6は、拘束手段における穴と回転体との当接状態を示す図3のVⅠ-VⅠ線の断面図である。

【0024】図1に示すように、筐体10の前部には化粧部となるノーズ11が固定されている。このノーズ11には挿入口が開口しており、マガジンMは、前記挿入口から筐体10の長辺方向へ向けて挿入される。

【0025】マガジンMは、図示左側(装置奥側;X1側)に開口部M1が形成された箱体であり、その内部には複数枚のトレイTが前記開口部M1から引出し自在に収納されている。各トレイT上にはCDやDVDなどの光記録方式、または光磁気記録方式のディスクDが載置されている。

【0026】筐体10内の奥側には、昇降ユニット20が設けられている。図2に示すように、昇降ユニット20では昇降ベース21上に駆動ユニット30が支持されている。

【0027】図1および図2に示すように、前記昇降ベース21の両側部には、ガイドピン22、22が固定されている。図1に示すように、筐体10の両側板には、縦方向に延びる昇降案内溝10a、10aが形成されており、前記ガイドピン22、22が昇降案内溝10a、10aに挿入されて、筐体10内において前記昇降ベース21および昇降ユニット20が上下方向へ昇降動作自在に支持されている。

【0028】図1に示すように、筐体10の一方の側板の外側には選択駆動板23が設けられ、X1-X2方向へ摺動自在に支持されている。筐体10の他方の側板の外側にも同様に選択駆動板が設けられている。筐体10の底部には、前記両選択駆動板を互いに逆の方向へ駆動する選択駆動部(図示せず)が設けられている。

【0029】図1に示すように、選択駆動板23には、傾斜し且つ階段状に形成された選択穴23a、23aが形成されており、前記昇降ベース21に設けられた前記ガイドピン22、22はこの選択穴23a、23a内に挿入されている。

【0030】図1において選択駆動板23がX1方向へ移動すると、前記選択穴23a、23aの移動に案内されて昇降ユニット20が下降し、選択駆動板23がX2方向へ移動すると、昇降ユニット20が上昇する。ガイドピン22、22が前記選択穴23a、23aの階段部分に位置しているときに、昇降ユニット20が、マガジンM内のいずれかのトレイを選択できる位置に停止する。

【0031】図2に示すように、昇降ベース21には、底板21aと、この底板21aの両側部において立ち上がるように曲げ加工された側板21b、21cとが一体に形成されている。

【0032】前記底板21a上には、弾性支持部材としてダンパー25、25、25が取り付けられている。駆動ユニット30のドライブシャシ31には下方に延びる支持ピン32が3箇所固定されており、この各支持ピン32が前記各ダンパー25、25、25に支持されている。これにより、駆動ユニット30は、昇降ベース21上の底板21a上で、弾性支持部材である前記ダンパー25、25、25を介して弾性支持されている。駆動ユニット30が昇降ベース21上で弾性支持されていることにより、車載用の場合に車体振動が筐体10に作用しても、駆動ユニット30に直接に車体振動が伝達されるのを防止できる。

【0033】図2および図3に示すように、ドライブシャシ31には、回転テーブル33が回転自在に支持されており、ドライブシャシ31の底部には前記回転テーブル33を回転駆動するスピンドルモータ34が固定されている。またドライブシャシ31には、光ヘッド35が設けられ、またこの光ヘッド35をディスクの記録面に沿って移動させるスレット機構が搭載されている。

【0034】図2および図4に示すように、ドライブシャシ31上にはクランプアーム37が設けられている。クランプアーム37の基端部は、回転支点36により前記ドライブシャシ31に回転自在に支持されている。またクランプアーム37の先端部にはクランパ38が回転自在に支持されている。

【0035】前記クランプアーム37の側部にはX2方向に延びる持ち上げ腕37aが一体に設けられ、この持ち上げ腕37aの先端に持ち上げピン39が固定されている。ドライブシャシ31にはクランプばね40が設けられている。クランプばね40はトーションばねであり、その一方の腕はドライブシャシ31に支持されており、他方の腕40aは前記持ち上げピン39に上側から掛けられている。このクランプばね40のばね力により、クランプアーム37がドライブシャシ31の方向へ付勢され、クランパ38が回転テーブル33に押圧可能となっている。

【0036】図3に示すように、ドライブシャシ31のY2側の側面には、前部に案内ピン42が固定され、これと逆の後部側では、案内片31aが一体に折り曲げ形成されている。ドライブシャシ31のY1側の側面では、前部と後部にそれぞれ案内ピン42が固定されている。

【0037】図2に示すように、前記昇降ベース21のY1側の側板21cは、X1-X2方向へ長く延びている。前記側板21cには、X1-X2方向に延びる一対

の移送案内溝21dと21eが形成されている。前記側板21cの外側には移送部材26が設けられている。移送部材26には一对のガイドピン27a、27aが固定されており、一方のガイドピン27aは前記一方の移送案内溝21dに挿入され、他方のガイドピン27aは前記他方の移送案内溝21eに挿入されている。

【0038】移送部材26にはフック24が回動自在に取付けられている。図示しない移送駆動手段によって移送部材26がX1方向へ駆動されるときに、前記フック24が、マガジンM内の選択されたトレイトの側面に掛止されるとともに、フック24によりトレイトが駆動ユニット30側へ引き出される。またトレイト上のディスクDの中心が回転テーブル33上に設置された後に、前記フック24によって、トレイトがマガジンM内に戻される。また、駆動ユニット30によるディスクDの駆動が完了したときにも、フック24によってマガジンM内のトレイトが駆動ユニット30内に引き出され、駆動が完了したディスクDを載置したトレイトが前記フック24によってマガジンM内に戻される。

【0039】前記昇降ベース21にはカムギヤ55が設けられ、このカムギヤ55は、昇降ベース21に搭載された切換えモータ43により正逆方向へ回転駆動される。

【0040】前記昇降ベース21の底板21aの上面には、第1の切換え部材44と第2の切換え部材45が共にX1-X2方向へ摺動自在に取り付けられている。第1の切換え部材44の下面にはフォロワー軸が固定されており、このフォロワー軸が前記底板21aに形成された開口部内を通過して前記カムギヤ55に形成されたカム溝内に摺動できるように挿入されている。

【0041】前記底板21aの上面には、連結部材46が支軸47により回動自在に支持されている。連結部材46の一端に設けられた連結ピンは前記第1の切換え部材44に掛止され、連結部材46の他端に設けられた連結ピン48は前記第2の切換え部材45に掛止されている。

【0042】前記カムギヤ55が回転すると、第1の切換え部材44がX1方向へ駆動され、これと同期して第2の切換え部材45がX2方向へ駆動される。カムギヤ55が逆転方向へ回転すると、前記とは逆に第1の切換え部材44がX2方向へ駆動され、これと同期して第2の切換え部材45がX1方向へ駆動される。

【0043】前記第1の切換え部材44の立ち上がり片には、拘束溝51と52が形成されており、第2の切換え部材45の立ち上がり片には拘束溝53と54が形成されている。前記駆動ユニット30のドライブシャシ31のY1-Y2方向の両側部に設けられた案内ピン42および案内片31aが、前記拘束溝51、52および拘束溝53、54によって拘束可能となっている。

【0044】また、第1の切換え部材44には、駆動ユ

ニット30に設けられた前記クランプアーム37に固定された持ち上げピン39を持ち上げ制御するクランプカム56が設けられている。

【0045】前記昇降ベース21と、駆動ユニット30のドライブシャシ31との間には拘束手段60が設けられている。拘束部材60は、回動体62と貫通穴70とから構成されている。

【0046】この拘束手段60では、昇降ベース21の底板21aに支持軸61が固定されており、この支持軸61に前記回動体62が回動自在に支持されている。前記回動体62は合成樹脂製であり、中心部に前記支持軸61に挿通される軸穴63が穿設されている。また回動体62の周囲には互いに直交する4方向へ延びる拘束部64が一体に形成されている。各拘束部64の先端部と前記軸穴63の中心との寸法は同一であり、回動体62の平面形状は、正十字形状である。図6に示すように、前記軸穴63が前記支持軸61に挿通された状態で、支持軸61の先端に抜け止めリング65が嵌着されて、回動体62の前記支持軸61からの抜け止めがなされている。

【0047】前記回動体62には駆動板66が一体に形成されている。この駆動板66には前記支持軸63に挿通される長穴67が形成されている。この長穴67は、直線部67aと変曲部67bとが連続している。

【0048】また、昇降ベース21に設けられた前記第1の切換え部材44には駆動腕44aが一体に延びており、この駆動腕44aに駆動ピン68が固定されている。図5に示すように、この駆動ピン68は前記駆動板66に形成された長穴67内に摺動自在に挿入されている。

【0049】図2に示すように、駆動ユニット30には貫通穴70が形成されている。この貫通穴70は、X1-X2方向へ延びる平行辺と、Y1-Y2方向へ延びる平行辺とを有する正方形である。この貫通穴70は、前記ドライブシャシ31と、このドライブシャシ31の下面に固定された樹脂シャシ72とを貫通して形成されている。

【0050】図2に示すように、前記貫通穴70では、前記樹脂シャシ72の内壁に、突起73が4箇所形成されている。各突起73はX1側とX2側およびY1側とY2側に設けられている。図6に示すように、前記各突起73は、その表面が上下方向へ曲面形状であり、下部側で前記回動体62の各拘束部64の先端部と隙間なく当接できる形状である。

【0051】次に上記ディスク装置の動作を説明する。図4(A)はディスク待機状態(ディスク非保持状態)、図4(B)は駆動ユニット30がロック状態で且つディスククランプ状態(ディスク保持状態)、図4(C)は駆動ユニット30のロック解除状態で且つディスククランプ状態(ディスク保持状態)をそれぞれ示し

ている。

【0052】図4(A)に示すように、マガジンM内のトレイトおよびディスクDを選択するディスク待機状態では、図2に示す昇降ベース21上の第1の切換え部材44がX1側に移動しており、第2の切換え部材45がX2側に移動している。このとき、駆動ユニット30のドライブシャシ31の側部に設けられた案内ピン42は、第1の切換え部材44の拘束溝51のX2側端部に保持されており、案内片31aは、第1の切換え部材44の拘束溝52のX2側の端部に保持されている。同様に、ドライブシャシ31のY1側の側面に固定されている各案内ピン42は、それぞれ第2の切換え部材45の各拘束溝53、54のX1側の端部に保持されている。

【0053】ドライブシャシ31の案内ピン42と案内片31aが、各拘束溝51、52、53、54に保持されているとき、ドライブシャシ31は全体として昇降ベース21の底板21aに接近するように下降させられている。これはダンパー25が押し変形させられた状態である。ここで、第1の切換え部材44の拘束溝51と第2の切換え部材45の拘束溝53は、X1側の拘束溝52および拘束溝54に比べて図示下側（昇降ベース21の底板21a側）に接近して形成されている。よって図4(A)のディスク待機状態では、駆動ユニット30のX2側の端部が下向きとなって、駆動ユニット30のドライブシャシ31がやや α 方向へ傾斜した姿勢である。

【0054】また図4(A)の状態では、クランプアーム37の持ち上げピン39が、第1の切換え部材44に形成されたクランプカム56により上方へ持ち上げられており、クランプアーム37の先端に設けられたクランパ38が回転テーブル33から離れている。よって、図4(A)の状態ではクランプアーム37が上方へ傾斜した状態、ドライブシャシ31が α 方向へ下向きに傾斜した状態であるため、X2側でドライブシャシ31とクランパ38とがトレイトおよびディスクDをX1方向へ導きやすい状態に上下に開かれている。

【0055】一方、拘束手段60では、図5(A)に示すように、第1の切換え部材44がX1方向へ移動しているため、駆動ピン68が、回転体62の駆動板66に形成された長穴67の直線部67aのX1側の端部に位置しており、よって回転体62が駆動ユニット30の貫通穴70の内部において時計方向へ回転させられ、回転体62の各拘束部64が、X1方向とX2方向ならびにY1方向とY2方向へ向けられている。

【0056】この状態では、図3に示すように、貫通穴70内の樹脂シャシ72の内壁に形成された各突起73と、回転体62の各拘束部64の先端部とが隙間なく当接し、好ましくはやや圧接状態に当接する。この回転体62の十字形状の各拘束部64と、各突起73との当

接（圧接）によって、昇降ベース21上において、駆動ユニット30がX1-X1方向およびY1-Y2方向の全方向に拘束されている。すなわち、駆動ユニット30は、ドライブシャシ31の面内での全方向へ動かないように拘束されている。

【0057】ここで、図6に示すように、貫通穴70の内壁の各突起73は、図6に示すように表面が曲面形状であり、前記各拘束部64の先端部と各突起73は、昇降ベースの底板21aに接近した位置でほぼ点接触あるいは最少の面積で接触している。よって、拘束手段60を拘束状態にしたまま、回転体62に対して駆動ユニット30を若干傾斜させることが可能である。したがって、図4(A)に示すように、待機状態で駆動ユニット30のX2側の端部が α 方向へ回転するように前記駆動ユニット30の全体が傾斜していたとしても、回転体62と貫通穴70との間で片寄り力が生じることがなく、駆動ユニット30のドライブシャシ31や樹脂シャシ72にストレスが作用せず、駆動ユニット30がX1-X2方向およびY1-Y2方向へ確実に拘束される。

【0058】図4(A)に示すように昇降ベース21上で駆動ユニット30が、前記拘束手段60によりX方向とY方向へ拘束され、さらにクランパ38が上方へ回転している状態で、マガジンM内のトレイトの選択動作が行われる。

【0059】この選択動作では、図1に示す筐体10の側面に設けられた選択駆動板23がX1-X2方向へ移動し、選択駆動板23に形成された選択穴23a、23aにより昇降ユニット20が上下に案内される。そして、昇降ユニット20が、マガジンM内の選択すべきトレイトの前方に対向した状態で、選択駆動板23が停止する。

【0060】次に、図2に示す移送部材26がX2側の端部からX1方向へ移動して、マガジンM内の選択されたトレイトがフック24によってマガジンM内からX1方向へ引き出される。引き出されたトレイト上のディスクDの中心が駆動ユニット30上の回転テーブル33の中心に一致すると、ディスクのクランプ動作が開始され、ディスクDが回転テーブル33とクランパ38とで挟持されてクランプされる。このクランプが完了すると、移送部材26がX2方向へ移動して、空のトレイトがマガジンM内に戻される。

【0061】前記クランプ動作では、マガジンM内から引き出されたトレイト上のディスクDの中心が回転テーブル33に一致した時点で、昇降ベース21上のカムギヤ55が回転し、第1の切換え部材44がX2方向へ移動し、第2の切換え部材45がX1方向へ移動する。この移動の途中で、図4(B)の状態となり、ドライブシャシ31の案内ピン42および案内片31aが、拘束溝51および52さらには拘束溝53と54から抜け出る直前において、前記各拘束溝51、52、53、54

の上方への隆起形状部分に至る。このとき、駆動ユニット30は、図4(A)に示す状態からやや持ち上げられ且つ水平姿勢となる。

【0062】この駆動ユニット30のわずかな上昇動作で回転テーブル33がトレイT上のディスクDの中心穴へ下方から嵌合する。同時にクランプカム56が持ち上げピン39から外れ、クランプばね40の弾性力によりクランプアーム37が回転し、引き出されたトレイT上のディスクDの中心部が回転テーブル33とクランプ38とでクランプされる。前記のようにこのクランプ完了の直後に移送部材26により空のトレイTがマガジンM内に戻される。

【0063】なお、拘束手段60が拘束状態のときには、図5(A)に示すように、回転体62の長穴67の直線部67aがX1-X2方向へ平行に延びている。よって第1の切換え部材44が図4(A)の位置からX2方向へ移動して図4(B)の状態に至る間、第1の切換え部材44に設けられた駆動ピン68が前記直線部67aをX2方向へ移動する。このとき、回転体62は回転せず、この回転体62で駆動ユニット30がX1-X2

方向およびY1-Y2方向へ拘束されたままである。【0064】そして、第1の切換え部材44が、さらにX2方向へ移動して図4(C)の状態に至り、同様に第2の切換え部材45がX1方向へ移動すると、駆動ユニット30の案内ピン42および案内片31aが各拘束溝51、52、53、54から外れる。

【0065】また、第1の切換え部材44が図4(B)の状態から図4(C)の状態へ移動する間、図5(B)に示すように、第1の切換え部材44に設けられた駆動ピン68が、長穴67の変曲部67b内に入り、回転体62が反時計方向へほぼ45度回転させられる。このとき回転体62の各拘束部64が、駆動ユニット30の貫通穴70の内壁の突起73から外れ、拘束手段60による拘束が解除される。

【0066】このように、ディスクDが回転テーブル33上にクランプされた状態で、昇降ベース21上において駆動ユニット30の拘束が解除され、駆動ユニット30がダンパー25で弾性的に支持される。この状態で、ディスクDが回転駆動され、光ヘッド35により記録または再生が行われる。

【0067】ディスクDの駆動が完了すると、図2に示す移送部材26のフック24によって、マガジンM内の空のトレイTが、駆動ユニット30上に引き出され、回転テーブル33上にクランプされたディスクDの下側へ空のトレイTが移動する。そして、昇降ベース21上のカムギヤ55が回転し、第1の切換え部材44が図4(C)の状態からX1方向へ移動させられ、このとき第2の切換え部材45もX2方向へ移動させられる。

【0068】第1の切換え部材44が図4(C)の位置から図4(B)の位置へ移動する間に、回転体62が図

5(B)の状態から時計方向へほぼ45度回転させられて図5(A)の状態になり、拘束手段60では、回転体62により駆動ユニット30が拘束される。さらに図4(A)の状態に至って、クランプ38がディスクDから離れてディスクDのクランプが解除される。そして、移送部材26がX2方向へ移動し、クランプが解除されたディスクDが載置されたトレイTがマガジンM内に戻される。

【0069】次に前記拘束手段の変形例を説明する。まず、図7に示す拘束手段60Aでは、図2または図5に示すように平面が十字形状の回転体62が使用されている。ただし、回転体62の4個の拘束部64のうちの少なくとも2個には、V字形の当接凹部64aが形成されている。また駆動ユニット30の貫通穴70の樹脂シャーン72の内壁には、嵌合当接部74が形成されている。回転体62が図5(A)に示す状態へ回転したときに、回転体62の各拘束部64によって、駆動ユニット30がX1-X2およびY1-Y2の全ての方向へ拘束されるとともに、前記当接凹部64a内に前記嵌合当接部74が入り込む。これにより、駆動ユニット30が、回転体62の支持軸61の軸方向へも拘束される。この拘束手段60Aでは、駆動ユニット30を3次元方向へ拘束することが可能である。

【0070】図8に示す拘束手段60Bでは、駆動ユニット30に非貫通の窪み部70Aが形成されており、この窪み部70Aの内壁に突起73が形成されている。昇降ベース21側に設けられた回転体62は前記窪み部70A内に挿入され、この窪み部70A内で回転することにより、図5(A)に示す拘束位置と図5(B)に示す非拘束位置となる。

【0071】図9に示す拘束手段60Cでは、駆動ユニット30に2つの貫通穴70Bと70Cが形成されている。この場合、一方の貫通穴70Cは、一方が開口した切欠き形状の穴である。

【0072】昇降ベース21側には、それぞれの貫通穴70Bと70C内に入る回転体62Aと62Bが設けられている。図9は各回転体62Aと62Bが拘束位置に回転した状態を示している。このとき、回転体62Aの両端部が貫通穴70Bの対向する内壁に加圧されて、駆動ユニット30が相反するX1方向とX2方向へ拘束される。同時に回転体62Bの両端部が貫通穴70Cの対向する内壁に加圧されて、駆動ユニット30が相反するY1方向とY2方向へ拘束される。よって、駆動ユニット30は平面内の各方向へ拘束される。

【0073】前記状態から、各回転体62Aと62Bがほぼ90度回転すると、前記拘束が解除される。

【0074】図10に示す拘束手段60Dでは、駆動ユニット30に2つの貫通穴70Dと70Eが形成されている。

【0075】昇降ベース21側には、それぞれの貫通穴

70Dと70E内に入る回転体62Cと62Dが設けられている。図10は各回転体62Cと62Dが拘束位置に回転した状態を示している。このとき、回転体62Cの端部が貫通穴70Dの各辺の内壁に加圧されて、駆動ユニット30が互いに直交するX2方向とY1方向へ拘束される。同時に回転体62Dの端部が貫通穴70Eの各辺の内壁に加圧されて、駆動ユニット30が互いに直交するX1方向とY2方向へ拘束される。よって、駆動ユニット30は平面内の各方向へ拘束される。

【0076】また、図10の状態から前記回転体62Cと62Dがほぼ45度か移動すると、前記駆動ユニット30への拘束が解除される。

【0077】なお、上記各実施の形態とは逆に、駆動ユニット側に回転体が設けられ、昇降ベース側に貫通穴または窪み部が形成されていてもよい。

【0078】また、本発明は、マガジンが装填されるディスク選択式のディスク装置に限られず、ディスクが1枚ずつ装填されるディスク装置などであっても実施可能である。

【0079】

【発明の効果】以上のように本発明では、駆動ユニットを拘束する拘束手段を、駆動ユニットの外方へ大きく突出しない機構として構成でき、駆動ユニットの周囲のスペースを拘束手段が広く占有することがない。また、1つの拘束手段で、駆動ユニットを多方向へ拘束する構造も容易に実現可能である。

【図面の簡単な説明】

【図1】本発明のディスク装置の実施の形態を示す側面図、

【図2】昇降ユニットを構成する昇降ベースと駆動ユニットを示す斜視図、

【図3】駆動ユニットを示す平面図、

【図4】(A)(B)(C)は、駆動ユニットでのディスククランプとクランプ解除動作を示す動作別の部分側面図、

【図5】(A)(B)は拘束手段を動作別に示す部分平面図、

【図6】拘束手段の拘束状態を示すものであり、図3のVI-VI線の断面図、

*

*【図7】拘束手段の変形例を示す断面図、

【図8】拘束手段の変形例を示す断面図、

【図9】拘束手段の変形例を示す駆動ユニットの平面図、

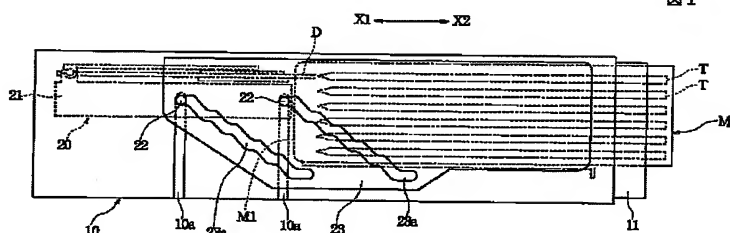
【図10】拘束手段の変形例を示す駆動ユニットの平面図、

【図11】(A)(B)は従来のディスク装置を示す動作別の側面図、

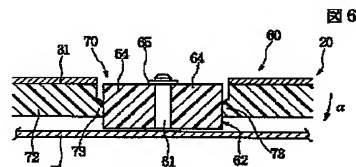
【符号の説明】

- 10 ディスク
- 20 トレイ
- 21 マガジン
- 22 筐体
- 23 昇降ユニット
- 24 昇降ベース
- 25 選択駆動板
- 26 フック
- 27 ダンパー
- 28 移送部材
- 29 駆動ユニット
- 30 ドライブシャシ
- 31 回転テーブル
- 32 スピンドルモータ
- 33 光ヘッド
- 34 クランプアーム
- 35 クランプ
- 36 持ち上げピン
- 37 案内ピン
- 38 第1の切換え部材
- 39 第2の切換え部材
- 40 51, 52, 53, 54 拘束溝
- 41 56 クランプカム
- 42 60, 60A, 60B, 60C, 60D 拘束手段
- 43 62, 62A, 62B, 62C, 62D 回転体
- 44 64 拘束部
- 45 70, 70B, 70C, 70D, 70E 貫通穴
- 46 70A 窪み部
- 47 73 突起

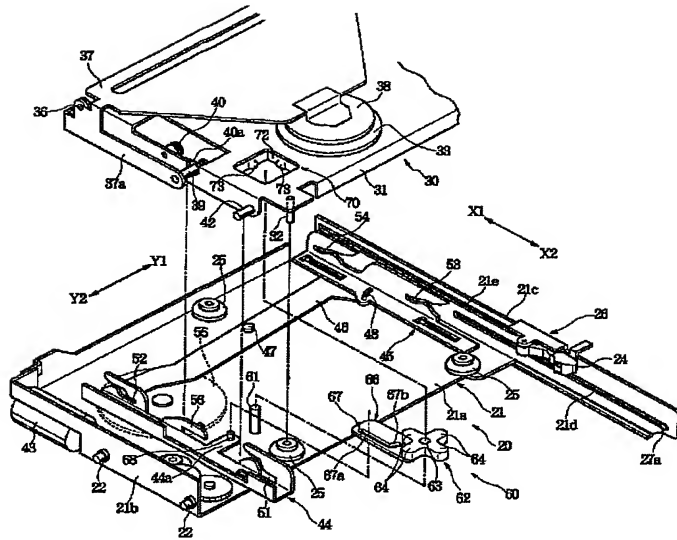
【図1】



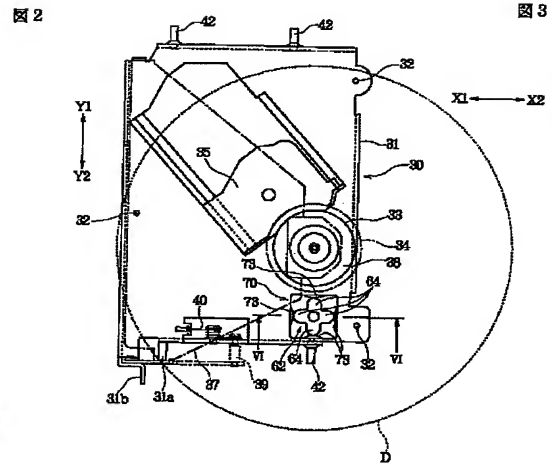
【図6】



【図2】

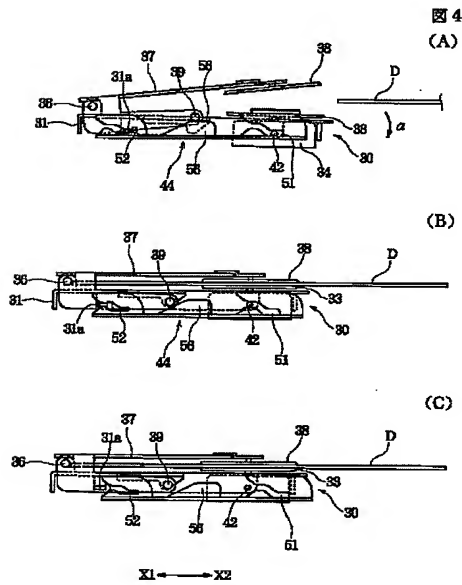


【図3】

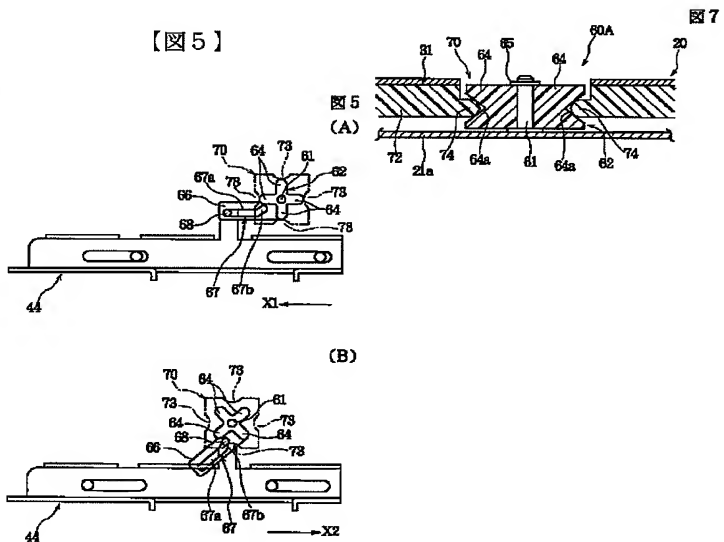


【図7】

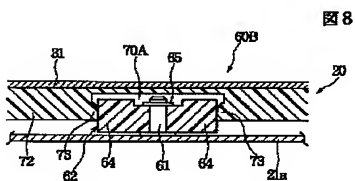
【図4】



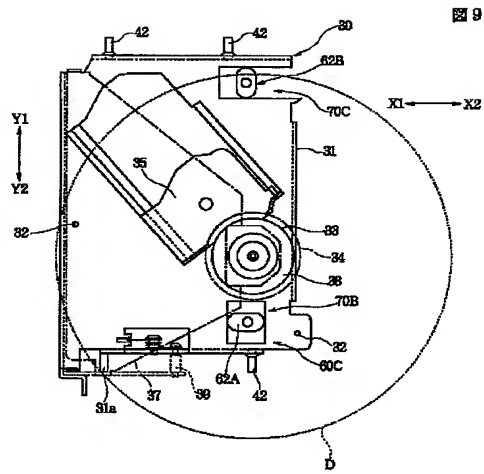
【図5】



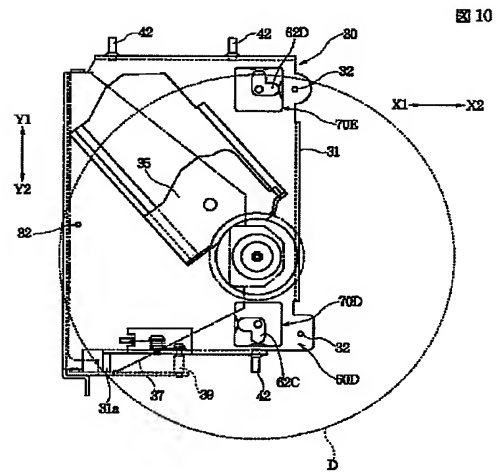
【図8】



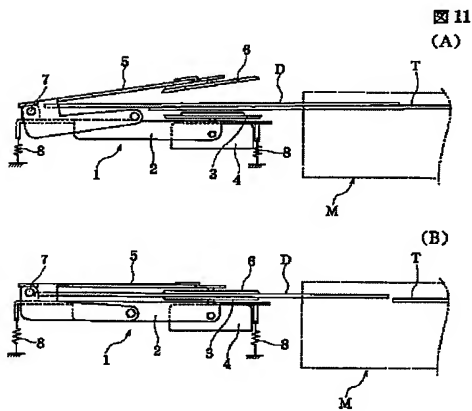
【図9】



【図10】



【図11】



フロントページの続き

Fターム(参考) 5D046 AA19 CB02 EA01 EA11 EB01
FA03 HA01
5D072 AB22 BD06 BG10 BH15 EB02
EB15 EB18

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention restrains a drive unit, when recording media, such as the shape of a disk, are equipped with and discharged, and when record and reading of a recording medium are performed, it relates to the drive of the recording medium which supports a drive unit in the state of elasticity.

[0002]

[Description of the Prior Art]Drawing 11 (A) and (B) is a side view showing a disk unit according to operation as an example of the drive of the recording medium for the conventional mount.

[0003]In this disk unit, two or more trays T are formed free [a cash drawer] in the magazine M with which it is loaded into a device, and the disk D is laid on each tray T. The clamp arm 5 supported by the drive chassis 2 and this drive chassis 2 via the axis 7 enabling free rotation is formed in the drive unit 1 which counters the loading position of said magazine M.

[0004]The spindle motor 4 which rotates the rotating table 3 and this rotating table 3, and the optical head are carried in the drive chassis 2. The clamping circuit 6 is supported by said clamp arm 5, enabling free rotation.

[0005]In this disk unit, when the drive unit 1 moves to a graphic display sliding direction, the tray T of either of the magazines M is chosen. After the drive unit 1 has stopped in the position which chose the tray, As shown in drawing 11 (A), the clamp arm 5 rotates upwards, the tray T chosen from the inside of the magazine M is pulled

out towards the drive unit 1, and the center of the disk D on the tray T is clamped by the clamping circuit 6 on the rotating table 3. If the empty tray T will be pulled out on the drive unit 1 if the drive of the disk D is completed, and the tray T results under the disk D, The clamp arm 5 goes up, the clamping circuit 6 separates from the disk D, the clamp of the disk D is canceled, and the disk D of a free state is laid on the tray T, and is returned in the magazine M.

[0006]

[Problem(s) to be Solved by the Invention]While the drive unit 1 is loaded with the disk D and it is driving as shown in drawing 11 (B) when using said disk unit as an object for mount, it is required to support the drive unit 1 elastically at the elastic members 8, such as a damper. Thus, by carrying out elastic support of the drive unit 1, when car body vibration is given, this vibration can be prevented from having an adverse effect on the drive operation of the disk D. On the other hand, as shown in drawing 11 (A), when pulling out the disk D from the inside of the magazine M, It is required to lead so that the center of the disk D can be positioned on the rotating table 3, and when returning the disk D on the rotating table 3 in the magazine M, it is required to lead the disk D to the position in the magazine M correctly. For that purpose, it is required to restrain the drive chassis 2 of the drive unit 1 currently supported by the elastic member 8.

[0007]As a restriction means which restrains the drive chassis 2 as mentioned above in the case of introduction of the disk D to the drive unit 1, and discharge, What arranges a restraining lever etc. on the outside of the drive unit 1, advances this restraining lever, or makes it rotate conventionally, makes this restraining lever hang on the drive chassis 2, and restrains the drive unit 1 was common.

[0008]However, if the aforementioned restraining lever is arranged on the outside of the drive unit 1, in order to have to secure the field which operates said restraining lever on the outside of the drive unit 1, arrangement of other parts around the drive unit 1 is restrained, and there is a fault that the flexibility of a design falls.

[0009]At the thing which advances a restraining lever, or is made to rotate it on the outside of the drive unit 1, and is made to hang on the drive chassis 2, a drive unit can be restrained only to one way by one restraining lever. Therefore, in order to restrain the drive unit 1 to for all directions, many restraining levers must be arranged so that the circumference of the drive unit 1 may be surrounded, and the part mark around the drive unit 1 increase further. When the number of restraining levers was reduced and a restraining lever is made to hang on the drive chassis 2, the drive unit 1 is pushed in the direction of either by a restraining lever, the position of the drive unit 1

shifts, and the problem which cannot position the drive unit 1 correctly to the magazine M arises.

[0010]Without this invention's solving the above-mentioned conventional technical problem, and making a mechanism project greatly to the exterior of a drive unit, it enables it to restrain a drive unit and aims at providing the drive of the recording medium which does not restrain the space around a drive unit.

[0011]This invention is a restriction means of one or a small number, and an object of this invention is to provide the drive of the recording medium which is stabilized to for all directions and enabled it to restrain a drive unit as could restrain the drive unit to multiple directions.

[0012]

[Means for Solving the Problem]A drive unit which performs record to a recording medium or reading from a recording medium this invention, In a drive of a recording medium with which a restriction means which restrains said drive unit on said base when it is supported via an elastic member on a base and said drive unit is loaded with a recording medium, and/or when discharging a recording medium from a drive unit is established, A through hole or a non-penetrating hollowed part by which said restriction means was provided in either one of said drive unit or a base, Have a rotating body which is provided in another side and enters in said hole or a hollowed part, and a rotational driving means which rotates said rotating body, and by said rotational driving means said rotating body, A rotation change is carried out at a restricted position which at least one place hits a wall of said hole or a hollowed part, and restrains a drive unit on a base, and a restriction release position from which said solid of revolution separates from said wall.

[0013]In this invention, when a rotating body rotates in a hole established in a drive unit or a base, or a hollow, a restraint and restriction release of a drive unit are performed. Therefore, it is not necessary to arrange on a base a mechanism element which constitutes a restriction means on a periphery of a drive unit, and effective use of a space in a periphery of a drive unit can be performed.

[0014]Said hole in this invention may be a hole of a thing which carries out an opening to a quadrangle or a triangle, or notch shape in which one side carried out the opening to an edge of a drive unit.

[0015]For example, as shown in drawing 10, said rotating body rotated in said restricted position is equivalent to at least two places of a wall of said hole or a hollowed part, and is made to what is restrained to a 2-way from which a motion of a drive unit on a base differs.

[0016]Or as shown in drawing 9, said rotating body rotated in said restricted position is equivalent to two places where a wall of said hole or a hollowed part counters, and it may be restrained to a 2-way with which a motion of a drive unit on a base disagrees.

[0017]As shown in drawing 3, said rotating body rotated in said restricted position is equivalent to at least three places of a wall of said hole or a hollowed part, and it is preferred that a motion of a drive unit on a base is what is restrained in all the directions of [on a flat surface which intersects perpendicularly with a rotating shaft of a rotating body].

[0018]As shown in drawing 7, it is also possible to constitute so that at least one copy of said rotating body which rotated in said restricted position may restrain a wall of said hole or a hollowed part in the direction parallel to a rotating shaft of said rotating body and a motion of a drive unit on a base may be restrained in the direction parallel to said rotating shaft.

[0019]In this invention, said recording medium is a disk-like, and it is suitable for that in which a pivot means which makes said drive unit rotate a recording medium of the shape of said disk, and a head which counters a rotating recording medium or contacts are provided.

[0020]However, recording media may be cassette tapes other than the shape of a disk, an IC package, etc.

[0021]On said drive unit, a clamp device which makes the central part of a disk-like recording medium hold to said pivot means is established, A driving means which drives said clamp device makes said rotational driving means serve a double purpose, and when set as the state where said clamp device holds a recording medium by this driving means, said rotating body shall be rotated by this driving means to a restriction release position.

[0022]As mentioned above, it becomes unnecessary to establish a driving means for exclusive use which rotates a rotating body by using also [driving means / which operates other mechanisms as a rotational driving means for carrying out the rotation change of the rotating body].

[0023]

[Embodiment of the Invention]The side view in which drawing 1 shows the disk unit of this invention, the perspective view in which drawing 2 shows a rise-and-fall base and the drive unit supported on it, The top view of a drive unit, the side view according to operation, as for drawing 3, drawing 4 (A), (B), and (C) indicates the clamp motion of a disk to be, Drawing 5 (A) and (B) is a sectional view of the VI-VI line of drawing 3 which a rotating body shows the contact state of a hole and a rotating body. [in / in

the part plan and drawing 6 in which the state where the rotation change was carried out at the restricted position and the restriction release position is shown / a restriction means]

[0024]As shown in drawing 1, the nose 11 used as a makeup part is being fixed to the anterior part of the case 10. The loading slot is carrying out the opening to this nose 11, and the magazine M is inserted towards the long side direction of the case 10 from said loading slot.

[0025]The magazine M is the box in which the opening M1 was formed in graphic display left-hand side (device back side; X1 side), and the tray T of two or more sheets is stored by the inside free [a cash drawer] from said opening M1. On each tray T, the disk D of optical recording methods, such as CD and DVD, or magneto optic recording is laid.

[0026]The rise-and-fall unit 20 is formed in the back side in the case 10. As shown in drawing 2, in the rise-and-fall unit 20, the drive unit 30 is supported on the rise-and-fall base 21.

[0027]As shown in drawing 1 and drawing 2, the guide pins 22 and 22 are being fixed to the side part of said rise-and-fall base 21. As shown in drawing 1, the rise-and-fall guide rails 10a and 10a which extend in a lengthwise direction are formed in the both-sides board of the case 10, Said guide pins 22 and 22 are inserted in the rise-and-fall guide rails 10a and 10a, and said rise-and-fall base 21 and the rise-and-fall unit 20 are supported in the case 10 to the sliding direction, enabling free ascent and descent operation.

[0028]As shown in drawing 1, the selection driving board 23 is formed in the outside of one side plate of the case 10, and it is supported to the X1-X 2-way, enabling free sliding. The selection driving board is formed also like the outside of the side plate of another side of the case 10. The selection driving part (not shown) which drives said both selection driving board of each other in the reverse direction is provided in the pars basilaris ossis occipitalis of the case 10.

[0029]As shown in drawing 1, it inclines to the selection driving board 23, and the selected holes 23a and 23a formed stair-like are formed in it, and said guide pins 22 and 22 provided in said rise-and-fall base 21 are inserted into these selected holes 23a and 23a.

[0030]If it will show around at movement of said selected holes 23a and 23a, and the rise-and-fall unit 20 will descend, if 23 moves in the selection driving board X1 direction in drawing 1, and the selection driving board 23 moves to X 2-way, the rise-and-fall unit 20 will go up. When the guide pins 22 and 22 are located in the

stairway portion of said selected holes 23a and 23a, the rise-and-fall unit 20 stops in the position which can choose the tray of either of the magazines M.

[0031]As shown in drawing 2, the bottom plate 21a and the side plates 21b and 21c by which bending was carried out so that it might rise in the side part of this bottom plate 21a are formed in the rise-and-fall base 21 at one.

[0032]On said bottom plate 21a, the dampers 25, 25, and 25 are attached as an elastic support member. The holding pin 32 caudad prolonged in the drive chassis 31 of the drive unit 30 is being fixed to three places, and each of this holding pin 32 is supported by said each dampers 25, 25, and 25. Thereby, elastic support of the drive unit 30 is carried out via said dampers 25, 25, and 25 which are elastic support members on the bottom plate 21a on the rise-and-fall base 21. Even if car body vibration acts on the case 10 by carrying out elastic support of the drive unit 30 on the rise-and-fall base 21 in for mount, car body vibration can be prevented from being directly transmitted to the drive unit 30.

[0033]As shown in drawing 2 and drawing 3, the rotating table 33 is supported by the drive chassis 31, enabling free rotation, and the spindle motor 34 which rotates said rotating table 33 is being fixed to the pars basilaris ossis occipitalis of the drive chassis 31. The threat mechanism to which the optical head 35 is formed and this optical head 35 is moved over the recording surface of a disk is carried in the drive chassis 31.

[0034]As shown in drawing 2 and drawing 4, the clamp arm 37 is formed on the drive chassis 31. The base end of the clamp arm 37 is supported by said drive chassis 31 by the rotational fulcrum 36, enabling free rotation. The clamping circuit 38 is supported by the tip part of the clamp arm 37, enabling free rotation.

[0035]in the flank of said clamp arm 37, it extends at X 2-way -- raise and the arm 37a is formed in one -- this -- it raises, and raises to the tip part of the arm 37a, and the pin 39 is being fixed. The clamp spring 40 is formed in the drive chassis 31. the clamp spring 40 is a torsion spring and the arm of one of these is supported by the drive chassis 31 -- the arm 40a of another side -- said -- it raises and is hung on the pin 39 from the upper part. The clamp arm 37 is energized in the direction of the drive chassis 31 by the spring power of this clamp spring 40, and the clamping circuit 38 can press to the rotating table 33.

[0036]As shown in drawing 3, the guide pins 42 are fixed to anterior part by the side by the side of the 31 drive chassisY2, and the piece 31a of guidance is bent and formed in it by the rear side contrary to this at one. In the side by the side of the 31 drive chassisY1, the guide pins 42 are being fixed to anterior part and the rear, respectively.

[0037]As shown in drawing 2, the side plate 21c by the side of said 21 rise-and-fall base Y1 is prolonged for a long time to the X1-X 2-way. The transfer guide rails 21d and 21e of the couple prolonged in a X1-X 2-way are formed in said side plate 21c. The transferring member 26 is formed in the outside of said side plate 21c. The guide pins 27a and 27a of the couple are being fixed to the transferring member 26, one guide pin 27a is inserted in 21 d of said one transfer guide rails, and the guide pin 27a of another side is inserted in the transfer guide rail 21e of said another side.

[0038]The hook 24 is attached to the transferring member 26, enabling free rotation. When 26 drives in the transferring member X1 direction by the transfer driving means which is not illustrated, while said hook 24 is hung on the side of the selected tray T in the magazine M, the tray T is pulled out by the hook 24 to the drive unit 30 side. After the center of the disk D on the tray T is installed on the rotating table 33, the tray T is returned in the magazine M by said hook 24. Also when the drive of the disk D by the drive unit 30 is completed, the tray T in the magazine M is pulled out by the hook 24 in the drive unit 30, and the tray T which laid the disk D which the drive completed is returned in the magazine M by said hook 24.

[0039]The cam gear 55 is formed in said rise-and-fall base 21, and this cam gear 55 is rotated to a right opposite direction by the change motor 43 carried in the rise-and-fall base 21.

[0040]The 1st switching member 44 and 2nd switching member 45 are attached to both the upper surfaces of the bottom plate 21a of said rise-and-fall base 21 to the X1-X 2-way, enabling free sliding. The follower axis is being fixed to the undersurface of the 1st switching member 44, and it is inserted so that this follower axis can slide in the cam groove which passed through the inside of the opening formed in said bottom plate 21a, and was formed in said cam gear 55.

[0041]The connecting member 46 is supported by the pivot 47 by the upper surface of said bottom plate 21a, enabling free rotation. The connecting pin provided in one end of the connecting member 46 is hung on said 1st switching member 44, and the connecting pin 48 provided in the other end of the connecting member 46 is hung on said 2nd switching member 45.

[0042]If said cam gear 55 rotates, it will drive in the 44Xswitching member 1 direction of the 1st, and the 2nd switching member 45 will drive to X 2-way synchronizing with this. If the cam gear 55 rotates to a reverse rotation direction, contrary to the above, the 1st switching member 44 will drive to X 2-way, and 45 will drive in the switching member of ** 2nd X1 direction synchronizing with this.

[0043]The restricted slots 51 and 52 are formed in the rising piece of said 1st

switching member 44, and the restricted slots 53 and 54 are formed in the rising piece of the 2nd switching member 45. The guide pins 42 and the piece 31a of guidance which were provided in the side part of the Y1-Y 2-way of the drive chassis 31 of said drive unit 30 can restrain by said restricted slots 51 and 52 and the restricted slots 53 and 54.

[0044]The clamp cam 56 which was fixed to said clamp arm 37 provided in the drive unit 30 and which raises, and raises and controls the pin 39 is formed in the 1st switching member 44.

[0045]The restriction means 60 is established between said rise-and-fall base 21 and the drive chassis 31 of the drive unit 30. The restricting member 60 comprises the rotating body 62 and the through hole 70.

[0046]In this restriction means 60, the supporting spindle 61 is being fixed to the bottom plate 21a of the rise-and-fall base 21, and said rotating body 62 is supported by this supporting spindle 61, enabling free rotation. Said rotating body 62 is a product made of a synthetic resin, and the axial hole 63 inserted in said supporting spindle 61 is drilled in the central part. The restrain part 64 prolonged in the four directions which intersect perpendicularly with the circumference of the rotating body 62 mutually is formed in one. The size of the tip part of each restrain part 64 and the center of said axial hole 63 is the same, and the plane shape of the rotating body 62 is right cross-joint shape. As shown in drawing 6, where said axial hole 63 is inserted in said supporting spindle 61, the slip off stop ring 65 is attached at the tip of the supporting spindle 61, and the slip off stop from said supporting spindle 61 of the rotating body 62 is made.

[0047]The driving plate 66 is formed in said rotating body 62 at one. The oblong hole 67 inserted in said supporting spindle 63 is formed in this driving plate 66. In this oblong hole 67, the straight part 67a and the inflection part 67b are continuing.

[0048]In said 1st switching member 44 provided in the rise-and-fall base 21, the driving arm 44a is prolonged at one, and the drive pin 68 is being fixed to this driving arm 44a. As shown in drawing 5, this drive pin 68 is inserted into the oblong hole 67 formed in said driving plate 66, enabling free sliding.

[0049]As shown in drawing 2, the through hole 70 is formed in the drive unit 30. This through hole 70 is a square which has a parallel edge which extends to a X1-X 2-way, and a parallel edge which extends to a Y1-Y 2-way. This through hole 70 penetrates said drive chassis 31 and the resin chassis 72 fixed to the undersurface of this drive chassis 31, and is formed.

[0050]As shown in drawing 2, four projections 73 are formed in the wall of said resin

chassis 72 in said through hole 70. It is provided in each projection 73X1, X2 and Y1, and Y2 side. As shown in drawing 6, the surface is curved surface shape in a sliding direction, and said each projection 73 is the shape which can contact the tip part of each restrain part 64 of said rotating body 62 without a crevice by the lower part side. [0051]Next, operation of the above-mentioned disk unit is explained. As for drawing 4 (A), the drive unit 30 a disk waiting state (disk non-holding state) and drawing 4 (B) in a locked position And a disk clamp state (disk holding state), Drawing 4 (C) is a lock released condition of the drive unit 30, and shows the disk clamp state (disk holding state), respectively.

[0052]As shown in drawing 4 (A), in the disk waiting state which chooses the tray T and the disk D in the magazine M, 44 is moving to the 1st switching member X1 side on the rise-and-fall base 21 shown in drawing 2, and 45 is moving to the 2nd switching member X2 side. At this time, the guide pins 42 provided in the flank of the drive chassis 31 of the drive unit 30 are held in 51Xrestricted slot 2 side edge part of the 1st switching member 44, and the piece 31a of guidance is held at the end by the side of the 52 restricted slot X2 of the 1st switching member 44. Similarly, each guide pins 42 currently fixed to the side by the side of the 31 drive chassisY1 are held at each restricted slot 53 of the 2nd switching member 45, and the end by the side of X1 [54], respectively.

[0053]When the guide pins 42 and the piece 31a of guidance of the drive chassis 31 are held in each restricted slots 51, 52, 53, and 54, the drive chassis 31 is dropped so that the bottom plate 21a of the rise-and-fall base 21 may be approached as a whole. This is in the state pushed and changed by the damper 25. Here, the restricted slot 51 of the 1st switching member 44 and the restricted slot 53 of the 2nd switching member 45 are approached and formed in the graphic display bottom (bottom plate 21a side of the rise-and-fall base 21) compared with the restricted slot 52 and the restricted slot 54 by the side of X1. Therefore, in the disk waiting state of drawing 4 (A), the end by the side of the 30 drive unit X2 serves as facing down, and the drive chassis 31 of the drive unit 30 is the posture a little inclined in the direction of alpha.

[0054]In the state of drawing 4 (A), the clamp arm 37 raises, the pin 39 is raised upwards by the clamp cam 56 formed in the 1st switching member 44, and the clamping circuit 38 provided in the tip part of the clamp arm 37 is separated from the rotating table 33. Therefore, since it is in the state toward which the clamp arm 37 inclined upwards in the state of drawing 4 (A), and the state in which the drive chassis 31 inclined in the direction of alpha downward, the drive chassis 31 and the clamping circuit 38 are opened up and down by X2 side by the state of being easy to draw D in

the tray T and disk X1 direction.

[0055]Since it is moving in the 44Xswitching member 1 direction of the 1st by the restriction means 60 on the other hand as shown in drawing 5 (A), The drive pin 68 is located in the end by the side of X1 of the straight part 67a of the oblong hole 67 formed in the driving plate 66 of the rotating body 62, Therefore, the rotating body 62 is rotated to a clockwise rotation in the inside of the through hole 70 of the drive unit 30, and each restrain part 64 of the rotating body 62 is turned to X1 direction, X 2-way and Y1 direction, and Y 2-way.

[0056]In this state, as shown in drawing 3, each projection 73 formed in the wall of the resin chassis 72 in the through hole 70 and the tip part of each restrain part 64 of the rotating body 62 contact without a crevice, and contact a press contact state a little preferably. Contact (pressure welding) depends as each projection 73 with each restrain part 64 of the cross-joint shape of this rotating body 62, and the drive unit 30 is restrained on the rise-and-fall base 21 in X1-X1 direction and all the directions of a Y1-Y 2-way. That is, the drive unit 30 is restrained so that it may not move in all the directions in the field of the drive chassis 31.

[0057]Here, as shown in drawing 6, as each projection 73 of the wall of the through hole 70 is shown in drawing 6, the surface is curved surface shape, and the tip part of each of said restrain part 64 and each projection 73 touch in point contact or the minimum area mostly by the position close to the bottom plate 21a of the rise-and-fall base. Therefore, it is possible to make the drive unit 30 incline a little to the rotating body 62, making the restriction means 60 into a restrained condition. Therefore, though said whole drive unit 30 inclines so that the end by the side of the 30 drive unit X2 may rotate in the direction of alpha by a waiting state as shown in drawing 4 (A), It inclines between the rotating body 62 and the through hole 70, power does not arise, and stress does not act on the drive chassis 31 or the resin chassis 72 of the drive unit 30, but the drive unit 30 is restrained certainly to a X1-X 2-way and a Y1-Y 2-way.

[0058]As shown in drawing 4 (A), the drive unit 30 is restrained by said restriction means 60 in the direction of X, and the direction of Y on the rise-and-fall base 21, and selection operation of the tray T in the magazine M is performed in the state where the clamping circuit 38 is rotating upwards further.

[0059]In this selection operation, the selection driving board 23 formed in the side of the case 10 shown in drawing 1 moves to a X1-X 2-way, and the rise-and-fall unit 20 is guided up and down by the selected holes 23a and 23a formed in the selection driving board 23. And after the rise-and-fall unit 20 has countered ahead of the tray T

in the magazine M which should be chosen, the selection driving board 23 stops.

[0060]Next, 26 moves in the X1 direction from the end by the side of the transferring member X2 shown in drawing 2, and the selected tray T in the magazine M is pulled out by the hook 24 in the X1 direction from the inside of the magazine M. If the center of the disk D on the pulled-out tray T is in agreement with the center of the rotating table 33 on the drive unit 30, the clamp motion of a disk will be started, and the disk D will be pinched and clamped by the rotating table 33 and the clamping circuit 38. If this clamp is completed, the transferring member 26 will move to X 2-way, and the empty tray T will be returned in the magazine M.

[0061]In said clamp motion, when the center of the disk D on the tray T pulled out out of the magazine M is in agreement with the rotating table 33, the cam gear 55 on the rise-and-fall base 21 rotates, the 1st switching member 44 moves to X 2-way, and 45 moves in the switching member of ** 2nd X1 direction. In the middle of this movement, it will be in the state of drawing 4 (B), and just before the guide pins 42 and the piece 31a of guidance of the drive chassis 31 escape from and come out from the restricted slots 51 and 52 and also the restricted slots 53 and 54, it results in the upheaval shaped part to the upper part of each of said restricted slots 51, 52, 53, and 54. At this time, the drive unit 30 is lifted a little from the state which shows in drawing 4 (A), and serves as a horizontal position.

[0062]The rotating table 33 fits in from a lower part to the center hole of the disk D on the tray T by the slight motion moving of this drive unit 30. The clamp cam 56 raises simultaneously and it separates from the pin 39, and the clamp arm 37 rotates according to the elastic force of the clamp spring 40, and the central part of the disk D on the pulled-out tray T is clamped by the rotating table 33 and the clamping circuit 38. The empty tray T is returned in the magazine M by the transferring member 26 immediately after this completion of a clamp as mentioned above.

[0063]When the restriction means 60 is a restrained condition, as shown in drawing 5 (A), the straight part 67a of the oblong hole 67 of the rotating body 62 has extended in parallel to the X1-X 2-way. Therefore, while the 1st switching member 44 moves to X 2-way from the position of drawing 4 (A) and resulting in the state of drawing 4 (B), the drive pin 68 provided in the 1st switching member 44 moves said straight part 67a to X 2-way. At this time, the rotating body 62 is not rotated but the drive unit 30 is restrained by this rotating body 62 to a X1-X 2-way and a Y1-Y 2-way.

[0064]And if the 1st switching member 44 moves to X 2-way further, it results in the state of drawing 4 (C) and 45 moves in the switching member of ** 2nd X1 direction similarly, the guide pins 42 and the piece 31a of guidance of the drive unit 30 will

separate from each restricted slots 51, 52, 53, and 54.

[0065]While the 1st switching member 44 moves to the state of drawing 4 (C) from the state of drawing 4 (B), as shown in drawing 5 (B), the drive pin 68 provided in the 1st switching member 44 enters in the inflection part 67b of the oblong hole 67, and the rotating body 62 is rotated about 45 degrees to a counterclockwise rotation. At this time, each restrain part 64 of the rotating body 62 separates from the projection 73 of the wall of the through hole 70 of the drive unit 30, and the restraint by the restriction means 60 is canceled.

[0066]Thus, where the disk D is clamped on the rotating table 33, the restraint of the drive unit 30 is canceled on the rise-and-fall base 21, and the drive unit 30 is elastically supported by the damper 25. In this state, the disk D rotates and record or playback is performed by the optical head 35.

[0067]If the drive of the disk D is completed, the tray T of the empty in the magazine M will be pulled out by the hook 24 of the transferring member 26 shown in drawing 2 on the drive unit 30, and the empty tray T will move to the disk D bottom clamped on the rotating table 33 by it. And the cam gear 55 on the rise-and-fall base 21 rotates, the 1st switching member 44 is moved in the X1 direction from the state of drawing 4 (C), and the 2nd switching member 45 is also moved to X 2-way at this time.

[0068]While the 1st switching member 44 moves to the position of drawing 4 (B) from the position of drawing 4 (C), the rotating body 62 is rotated from the state of drawing 5 (B) about 45 degrees to a clockwise rotation, and will be in the state of drawing 5 (A), and the drive unit 30 will be restrained by the rotating body 62 in the restriction means 60. Furthermore, very much, the clamping circuit 38 separates from the disk D in the state of drawing 4 (A), and the clamp of the disk D is canceled. And the transferring member 26 moves to X 2-way, and the tray T in which the disk D of which the clamp was canceled was laid is returned in the magazine M.

[0069]Next, the modification of said restriction means is explained. First, in the restriction means 60A shown in drawing 7, as shown in drawing 2 or drawing 5, the cross-joint-shaped rotating body 62 is used for the flat surface. However, the V type-like contact crevice 64a is formed in at least two of the four restrain parts 64 of the rotating body 62. The fitting contact part 74 is formed in the wall of the resin chassis 72 of the through hole 70 of the drive unit 30. When the rotating body 62 rotates to the state which shows in drawing 5 (A), while the drive unit 30 is restrained by each restrain part 64 of the rotating body 62 in all the directions of X1-X2 and Y1-Y2, said fitting contact part 74 enters in said contact crevice 64a by it. Thereby, the drive unit 30 is restrained also to the shaft orientations of the supporting spindle

61 of the rotating body 62. It is possible to restrain the drive unit 30 in the direction of a three dimension in this restriction means 60A.

[0070]In the restriction means 60B shown in drawing 8, the non-penetrating hollowed part 70A is formed in the drive unit 30, and the projection 73 is formed in the wall of this hollowed part 70A. The rotating body 62 provided in the rise-and-fall base 21 side is inserted into said hollowed part 70A, and serves as a non restraint position shown in the restricted position shown in drawing 5 (A), and drawing 5 (B) by rotating within this hollowed part 70A.

[0071]In the restriction means 60C shown in drawing 9, the two through holes 70B and 70C are formed in the drive unit 30. In this case, one through hole 70C is a hole of the notch shape in which one side carried out the opening.

[0072]Each through hole 70B and the rotating bodies 62A and 62B which enter in 70C are formed in the rise-and-fall base 21 side. Drawing 9 shows the state where each rotating bodies 62A and 62B rotated in the restricted position. At this time, the both ends of the rotating body 62A are pressurized by the wall in which the through hole 70B counters, and it is restrained to X1 direction and X 2-way with which the drive unit 30 disagrees. The both ends of the rotating body 62B are simultaneously pressurized by the wall in which the through hole 70C counters, and it is restrained to Y1 direction and Y 2-way with which the drive unit 30 disagrees. Therefore, the drive unit 30 is restrained for [within a flat surface] all directions.

[0073]Rotation of each rotating bodies 62A and 62B about 90 degrees will cancel said restraint of said state.

[0074]In the restriction means 60D shown in drawing 10, the two through holes 70D and 70E are formed in the drive unit 30.

[0075]Each through hole 70D and the rotating bodies 62C and 62D which enter in 70E are formed in the rise-and-fall base 21 side. Drawing 10 shows the state where each rotating bodies 62C and 62D rotated in the restricted position. At this time, the end of the rotating body 62C is pressurized by the wall of each neighborhood of the through hole 70D, and the drive unit 30 is restrained in X 2-way and Y1 direction which intersect perpendicularly mutually. The end of the rotating body 62D is simultaneously pressurized by the wall of each neighborhood of the through hole 70E, and the drive unit 30 is restrained to X1 direction and Y 2-way which intersect perpendicularly mutually. Therefore, the drive unit 30 is restrained for [within a flat surface] all directions.

[0076]If said rotating bodies 62C and 62D move in about 45 degrees from the state of drawing 10, the restraint to said drive unit 30 will be canceled.

[0077] Contrary to each above-mentioned embodiment, a rotating body may be provided in the drive unit side, and the through hole or the hollowed part may be formed in the rise-and-fall base side.

[0078] This invention is feasible, even if it is not restricted to the disk unit of the disk case index loaded with a magazine but a disk is a disk unit etc. with which it is loaded one sheet at a time.

[0079]

[Effect of the Invention] As mentioned above, by this invention, the restriction means which restrains a drive unit can be constituted as a mechanism which does not project greatly to a way outside a drive unit, and a restriction means does not occupy the space around a drive unit widely. The structure which restrains a drive unit to multiple directions is also easily realizable by one restriction means.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention restrains a drive unit, when recording media, such as the shape of a disk, are equipped with and discharged, and when record and reading of a recording medium are performed, it relates to the drive of the recording medium which supports a drive unit in the state of elasticity.

[0002]

[Description of the Prior Art] Drawing 11 (A) and (B) is a side view showing a disk unit according to operation as an example of the drive of the recording medium for the conventional mount.

[0003] In this disk unit, two or more trays T are formed free [a cash drawer] in the magazine M with which it is loaded into a device, and the disk D is laid on each tray T. The clamp arm 5 supported by the drive chassis 2 and this drive chassis 2 via the axis 7 enabling free rotation is formed in the drive unit 1 which counters the loading position of said magazine M.

[0004] The spindle motor 4 which rotates the rotating table 3 and this rotating table 3, and the optical head are carried in the drive chassis 2. The clamping circuit 6 is supported by said clamp arm 5, enabling free rotation.

[0005] In this disk unit, when the drive unit 1 moves to a graphic display sliding direction, the tray T of either of the magazines M is chosen. After the drive unit 1 has stopped in the position which chose the tray, As shown in drawing 11 (A), the clamp arm

5 rotates upwards, the tray T chosen from the inside of the magazine M is pulled out towards the drive unit 1, and the center of the disk D on the tray T is clamped by the clamping circuit 6 on the rotating table 3. If the empty tray T will be pulled out on the drive unit 1 if the drive of the disk D is completed, and the tray T results under the disk D, The clamp arm 5 goes up, the clamping circuit 6 separates from the disk D, the clamp of the disk D is canceled, and the disk D of a free state is laid on the tray T, and is returned in the magazine M.

[0006]

[Problem(s) to be Solved by the Invention]While the drive unit 1 is loaded with the disk D and it is driving as shown in drawing 11 (B) when using said disk unit as an object for mount, it is required to support the drive unit 1 elastically at the elastic members 8, such as a damper. Thus, by carrying out elastic support of the drive unit 1, when car body vibration is given, this vibration can be prevented from having an adverse effect on the drive operation of the disk D. On the other hand, as shown in drawing 11 (A), when pulling out the disk D from the inside of the magazine M, It is required to lead so that the center of the disk D can be positioned on the rotating table 3, and when returning the disk D on the rotating table 3 in the magazine M, it is required to lead the disk D to the position in the magazine M correctly. For that purpose, it is required to restrain the drive chassis 2 of the drive unit 1 currently supported by the elastic member 8.

[0007]As a restriction means which restrains the drive chassis 2 as mentioned above in the case of introduction of the disk D to the drive unit 1, and discharge, What arranges a restraining lever etc. on the outside of the drive unit 1, advances this restraining lever, or makes it rotate conventionally, makes this restraining lever hang on the drive chassis 2, and restrains the drive unit 1 was common.

[0008]However, if the aforementioned restraining lever is arranged on the outside of the drive unit 1, in order to have to secure the field which operates said restraining lever on the outside of the drive unit 1, arrangement of other parts around the drive unit 1 is restrained, and there is a fault that the flexibility of a design falls.

[0009]At the thing which advances a restraining lever, or is made to rotate it on the outside of the drive unit 1, and is made to hang on the drive chassis 2, a drive unit can be restrained only to one way by one restraining lever. Therefore, in order to restrain the drive unit 1 to for all directions, many restraining levers must be arranged so that the circumference of the drive unit 1 may be surrounded, and the part mark around the drive unit 1 increase further. When the number of restraining levers was reduced and a restraining lever is made to hang on the drive chassis 2, the drive unit 1 is pushed in the direction of either by a restraining lever, the position of the drive unit 1 shifts, and

the problem which cannot position the drive unit 1 correctly to the magazine M arises.

[0010]Without this invention's solving the above-mentioned conventional technical problem, and making a mechanism project greatly to the exterior of a drive unit, it enables it to restrain a drive unit and aims at providing the drive of the recording medium which does not restrain the space around a drive unit.

[0011]This invention is a restriction means of one or a small number, and an object of this invention is to provide the drive of the recording medium which is stabilized to for all directions and enabled it to restrain a drive unit as could restrain the drive unit to multiple directions.

[0012]

[Means for Solving the Problem]A drive unit which performs record to a recording medium or reading from a recording medium this invention, In a drive of a recording medium with which a restriction means which restrains said drive unit on said base when it is supported via an elastic member on a base and said drive unit is loaded with a recording medium, and/or when discharging a recording medium from a drive unit is established, A through hole or a non-penetrating hollowed part by which said restriction means was provided in either one of said drive unit or a base, Have a rotating body which is provided in another side and enters in said hole or a hollowed part, and a rotational driving means which rotates said rotating body, and by said rotational driving means said rotating body, A rotation change is carried out at a restricted position which at least one place hits a wall of said hole or a hollowed part, and restrains a drive unit on a base, and a restriction release position from which said solid of revolution separates from said wall.

[0013]In this invention, when a rotating body rotates in a hole established in a drive unit or a base, or a hollow, a restraint and restriction release of a drive unit are performed. Therefore, it is not necessary to arrange on a base a mechanism element which constitutes a restriction means on a periphery of a drive unit, and effective use of a space in a periphery of a drive unit can be performed.

[0014]Said hole in this invention may be a hole of a thing which carries out an opening to a quadrangle or a triangle, or notch shape in which one side carried out the opening to an edge of a drive unit.

[0015]For example, as shown in drawing 10, said rotating body rotated in said restricted position is equivalent to at least two places of a wall of said hole or a hollowed part, and is made to what is restrained to a 2-way from which a motion of a drive unit on a base differs.

[0016]Or as shown in drawing 9, said rotating body rotated in said restricted position is

equivalent to two places where a wall of said hole or a hollowed part counters, and it may be restrained to a 2-way with which a motion of a drive unit on a base disagrees.

[0017]As shown in drawing 3, said rotating body rotated in said restricted position is equivalent to at least three places of a wall of said hole or a hollowed part, and it is preferred that a motion of a drive unit on a base is what is restrained in all the directions of [on a flat surface which intersects perpendicularly with a rotating shaft of a rotating body].

[0018]As shown in drawing 7, it is also possible to constitute so that at least one copy of said rotating body which rotated in said restricted position may restrain a wall of said hole or a hollowed part in the direction parallel to a rotating shaft of said rotating body and a motion of a drive unit on a base may be restrained in the direction parallel to said rotating shaft.

[0019]In this invention, said recording medium is a disk-like, and it is suitable for that in which a pivot means which makes said drive unit rotate a recording medium of the shape of said disk, and a head which counters a rotating recording medium or contacts are provided.

[0020]However, recording media may be cassette tapes other than the shape of a disk, an IC package, etc.

[0021]On said drive unit, a clamp device which makes the central part of a disk-like recording medium hold to said pivot means is established, A driving means which drives said clamp device makes said rotational driving means serve a double purpose, and when set as the state where said clamp device holds a recording medium by this driving means, said rotating body shall be rotated by this driving means to a restriction release position.

[0022]As mentioned above, it becomes unnecessary to establish a driving means for exclusive use which rotates a rotating body by using also [driving means / which operates other mechanisms as a rotational driving means for carrying out the rotation change of the rotating body].

[0023]

[Embodiment of the Invention]The side view in which drawing 1 shows the disk unit of this invention, the perspective view in which drawing 2 shows a rise-and-fall base and the drive unit supported on it, The top view of a drive unit, the side view according to operation, as for drawing 3, drawing 4 (A), (B), and (C) indicates the clamp motion of a disk to be, Drawing 5 (A) and (B) is a sectional view of the VI-VI line of drawing 3 which a rotating body shows the contact state of a hole and a rotating body. [in / in the part plan and drawing 6 in which the state where the rotation change was carried out at the

restricted position and the restriction release position is shown / a restriction means]

[0024]As shown in drawing 1, the nose 11 used as a makeup part is being fixed to the anterior part of the case 10. The loading slot is carrying out the opening to this nose 11, and the magazine M is inserted towards the long side direction of the case 10 from said loading slot.

[0025]The magazine M is the box in which the opening M1 was formed in graphic display left-hand side (device back side; X1 side), and the tray T of two or more sheets is stored by the inside free [a cash drawer] from said opening M1. On each tray T, the disk D of optical recording methods, such as CD and DVD, or magneto optic recording is laid.

[0026]The rise-and-fall unit 20 is formed in the back side in the case 10. As shown in drawing 2, in the rise-and-fall unit 20, the drive unit 30 is supported on the rise-and-fall base 21.

[0027]As shown in drawing 1 and drawing 2, the guide pins 22 and 22 are being fixed to the side part of said rise-and-fall base 21. As shown in drawing 1, the rise-and-fall guide rails 10a and 10a which extend in a lengthwise direction are formed in the both sides board of the case 10, Said guide pins 22 and 22 are inserted in the rise-and-fall guide rails 10a and 10a, and said rise-and-fall base 21 and the rise-and-fall unit 20 are supported in the case 10 to the sliding direction, enabling free ascent and descent operation.

[0028]As shown in drawing 1, the selection driving board 23 is formed in the outside of one side plate of the case 10, and it is supported to the X1-X 2-way, enabling free sliding. The selection driving board is formed also like the outside of the side plate of another side of the case 10. The selection driving part (not shown) which drives said both selection driving board of each other in the reverse direction is provided in the pars basilaris ossis occipitalis of the case 10.

[0029]As shown in drawing 1, it inclines to the selection driving board 23, and the selected holes 23a and 23a formed stair-like are formed in it, and said guide pins 22 and 22 provided in said rise-and-fall base 21 are inserted into these selected holes 23a and 23a.

[0030]If it will show around at movement of said selected holes 23a and 23a, and the rise-and-fall unit 20 will descend, if 23 moves in the selection driving board X1 direction in drawing 1, and the selection driving board 23 moves to X 2-way, the rise-and-fall unit 20 will go up. When the guide pins 22 and 22 are located in the stairway portion of said selected holes 23a and 23a, the rise-and-fall unit 20 stops in the position which can choose the tray of either of the magazines M.

[0031]As shown in drawing 2, the bottom plate 21a and the side plates 21b and 21c by which bending was carried out so that it might rise in the side part of this bottom plate 21a are formed in the rise-and-fall base 21 at one.

[0032]On said bottom plate 21a, the dampers 25, 25, and 25 are attached as an elastic support member. The holding pin 32 caudad prolonged in the drive chassis 31 of the drive unit 30 is being fixed to three places, and each of this holding pin 32 is supported by said each dampers 25, 25, and 25. Thereby, elastic support of the drive unit 30 is carried out via said dampers 25, 25, and 25 which are elastic support members on the bottom plate 21a on the rise-and-fall base 21. Even if car body vibration acts on the case 10 by carrying out elastic support of the drive unit 30 on the rise-and-fall base 21 in for mount, car body vibration can be prevented from being directly transmitted to the drive unit 30.

[0033]As shown in drawing 2 and drawing 3, the rotating table 33 is supported by the drive chassis 31, enabling free rotation, and the spindle motor 34 which rotates said rotating table 33 is being fixed to the pars basilaris ossis occipitalis of the drive chassis 31. The threat mechanism to which the optical head 35 is formed and this optical head 35 is moved over the recording surface of a disk is carried in the drive chassis 31.

[0034]As shown in drawing 2 and drawing 4, the clamp arm 37 is formed on the drive chassis 31. The base end of the clamp arm 37 is supported by said drive chassis 31 by the rotational fulcrum 36, enabling free rotation. The clamping circuit 38 is supported by the tip part of the clamp arm 37, enabling free rotation.

[0035]in the flank of said clamp arm 37, it extends at X 2-way -- raise and the arm 37a is formed in one -- this -- it raises, and raises to the tip part of the arm 37a, and the pin 39 is being fixed. The clamp spring 40 is formed in the drive chassis 31. the clamp spring 40 is a torsion spring and the arm of one of these is supported by the drive chassis 31 -- the arm 40a of another side -- said -- it raises and is hung on the pin 39 from the upper part. The clamp arm 37 is energized in the direction of the drive chassis 31 by the spring power of this clamp spring 40, and the clamping circuit 38 can press to the rotating table 33.

[0036]As shown in drawing 3, the guide pins 42 are fixed to anterior part by the side by the side of the 31 drive chassisY2, and the piece 31a of guidance is bent and formed in it by the rear side contrary to this at one. In the side by the side of the 31 drive chassisY1, the guide pins 42 are being fixed to anterior part and the rear, respectively.

[0037]As shown in drawing 2, the side plate 21c by the side of said 21 rise-and-fall baseY1 is prolonged for a long time to the X1-X 2-way. The transfer guide rails 21d and 21e of the couple prolonged in a X1-X 2-way are formed in said side plate 21c. The

transferring member 26 is formed in the outside of said side plate 21c. The guide pins 27a and 27a of the couple are being fixed to the transferring member 26, one guide pin 27a is inserted in 21 d of said one transfer guide rails, and the guide pin 27a of another side is inserted in the transfer guide rail 21e of said another side.

[0038]The hook 24 is attached to the transferring member 26, enabling free rotation. When 26 drives in the transferring member X1 direction by the transfer driving means which is not illustrated, while said hook 24 is hung on the side of the selected tray T in the magazine M, the tray T is pulled out by the hook 24 to the drive unit 30 side. After the center of the disk D on the tray T is installed on the rotating table 33, the tray T is returned in the magazine M by said hook 24. Also when the drive of the disk D by the drive unit 30 is completed, the tray T in the magazine M is pulled out by the hook 24 in the drive unit 30, and the tray T which laid the disk D which the drive completed is returned in the magazine M by said hook 24.

[0039]The cam gear 55 is formed in said rise-and-fall base 21, and this cam gear 55 is rotated to a right opposite direction by the change motor 43 carried in the rise-and-fall base 21.

[0040]The 1st switching member 44 and 2nd switching member 45 are attached to both the upper surfaces of the bottom plate 21a of said rise-and-fall base 21 to the X1-X 2-way, enabling free sliding. The follower axis is being fixed to the undersurface of the 1st switching member 44, and it is inserted so that this follower axis can slide in the cam groove which passed through the inside of the opening formed in said bottom plate 21a, and was formed in said cam gear 55.

[0041]The connecting member 46 is supported by the pivot 47 by the upper surface of said bottom plate 21a, enabling free rotation. The connecting pin provided in one end of the connecting member 46 is hung on said 1st switching member 44, and the connecting pin 48 provided in the other end of the connecting member 46 is hung on said 2nd switching member 45.

[0042]If said cam gear 55 rotates, it will drive in the 44Xswitching member 1 direction of the 1st, and the 2nd switching member 45 will drive to X 2-way synchronizing with this. If the cam gear 55 rotates to a reverse rotation direction, contrary to the above, the 1st switching member 44 will drive to X 2-way, and 45 will drive in the switching member of ** 2nd X1 direction synchronizing with this.

[0043]The restricted slots 51 and 52 are formed in the rising piece of said 1st switching member 44, and the restricted slots 53 and 54 are formed in the rising piece of the 2nd switching member 45. The guide pins 42 and the piece 31a of guidance which were provided in the side part of the Y1-Y 2-way of the drive chassis 31 of said drive unit 30

can restrain by said restricted slots 51 and 52 and the restricted slots 53 and 54.

[0044]The clamp cam 56 which was fixed to said clamp arm 37 provided in the drive unit 30 and which raises, and raises and controls the pin 39 is formed in the 1st switching member 44.

[0045]The restriction means 60 is established between said rise-and-fall base 21 and the drive chassis 31 of the drive unit 30. The restricting member 60 comprises the rotating body 62 and the through hole 70.

[0046]In this restriction means 60, the supporting spindle 61 is being fixed to the bottom plate 21a of the rise-and-fall base 21, and said rotating body 62 is supported by this supporting spindle 61, enabling free rotation. Said rotating body 62 is a product made of a synthetic resin, and the axial hole 63 inserted in said supporting spindle 61 is drilled in the central part. The restrain part 64 prolonged in the four directions which intersect perpendicularly with the circumference of the rotating body 62 mutually is formed in one. The size of the tip part of each restrain part 64 and the center of said axial hole 63 is the same, and the plane shape of the rotating body 62 is right cross-joint shape. As shown in drawing 6, where said axial hole 63 is inserted in said supporting spindle 61, the slip off stop ring 65 is attached at the tip of the supporting spindle 61, and the slip off stop from said supporting spindle 61 of the rotating body 62 is made.

[0047]The driving plate 66 is formed in said rotating body 62 at one. The oblong hole 67 inserted in said supporting spindle 63 is formed in this driving plate 66. In this oblong hole 67, the straight part 67a and the inflection part 67b are continuing.

[0048]In said 1st switching member 44 provided in the rise-and-fall base 21, the driving arm 44a is prolonged at one, and the drive pin 68 is being fixed to this driving arm 44a. As shown in drawing 5, this drive pin 68 is inserted into the oblong hole 67 formed in said driving plate 66, enabling free sliding.

[0049]As shown in drawing 2, the through hole 70 is formed in the drive unit 30. This through hole 70 is a square which has a parallel edge which extends to a X1-X 2-way, and a parallel edge which extends to a Y1-Y 2-way. This through hole 70 penetrates said drive chassis 31 and the resin chassis 72 fixed to the undersurface of this drive chassis 31, and is formed.

[0050]As shown in drawing 2, four projections 73 are formed in the wall of said resin chassis 72 in said through hole 70. It is provided in each projection 73X1, X2 and Y1, and Y2 side. As shown in drawing 6, the surface is curved surface shape in a sliding direction, and said each projection 73 is the shape which can contact the tip part of each restrain part 64 of said rotating body 62 without a crevice by the lower part side.

[0051]Next, operation of the above-mentioned disk unit is explained. As for drawing 4

(A), the drive unit 30 a disk waiting state (disk non-holding state) and drawing 4 (B) in a locked position And a disk clamp state (disk holding state), Drawing 4 (C) is a lock released condition of the drive unit 30, and shows the disk clamp state (disk holding state), respectively.

[0052]As shown in drawing 4 (A), in the disk waiting state which chooses the tray T and the disk D in the magazine M, 44 is moving to the 1st switching member X1 side on the rise-and-fall base 21 shown in drawing 2, and 45 is moving to the 2nd switching member X2 side. At this time, the guide pins 42 provided in the flank of the drive chassis 31 of the drive unit 30 are held in 51Xrestricted slot 2 side edge part of the 1st switching member 44, and the piece 31a of guidance is held at the end by the side of the 52 restricted slot X2 of the 1st switching member 44. Similarly, each guide pins 42 currently fixed to the side by the side of the 31 drive chassisY1 are held at each restricted slot 53 of the 2nd switching member 45, and the end by the side of X1 [54], respectively.

[0053]When the guide pins 42 and the piece 31a of guidance of the drive chassis 31 are held in each restricted slots 51, 52, 53, and 54, the drive chassis 31 is dropped so that the bottom plate 21a of the rise-and-fall base 21 may be approached as a whole. This is in the state pushed and changed by the damper 25. Here, the restricted slot 51 of the 1st switching member 44 and the restricted slot 53 of the 2nd switching member 45 are approached and formed in the graphic display bottom (bottom plate 21a side of the rise-and-fall base 21) compared with the restricted slot 52 and the restricted slot 54 by the side of X1. Therefore, in the disk waiting state of drawing 4 (A), the end by the side of the 30 drive unit X2 serves as facing down, and the drive chassis 31 of the drive unit 30 is the posture a little inclined in the direction of alpha.

[0054]In the state of drawing 4 (A), the clamp arm 37 raises, the pin 39 is raised upwards by the clamp cam 56 formed in the 1st switching member 44, and the clamping circuit 38 provided in the tip part of the clamp arm 37 is separated from the rotating table 33. Therefore, since it is in the state toward which the clamp arm 37 inclined upwards in the state of drawing 4 (A), and the state in which the drive chassis 31 inclined in the direction of alpha downward, the drive chassis 31 and the clamping circuit 38 are opened up and down by X2 side by the state of being easy to draw D in the tray T and disk X1 direction.

[0055]Since it is moving in the 44Xswitching member 1 direction of the 1st by the restriction means 60 on the other hand as shown in drawing 5 (A), The drive pin 68 is located in the end by the side of X1 of the straight part 67a of the oblong hole 67 formed in the driving plate 66 of the rotating body 62, Therefore, the rotating body 62 is rotated

to a clockwise rotation in the inside of the through hole 70 of the drive unit 30, and each restrain part 64 of the rotating body 62 is turned to X1 direction, X 2-way and Y1 direction, and Y 2-way.

[0056]In this state, as shown in drawing 3, each projection 73 formed in the wall of the resin chassis 72 in the through hole 70 and the tip part of each restrain part 64 of the rotating body 62 contact without a crevice, and contact a press contact state a little preferably. Contact (pressure welding) depends as each projection 73 with each restrain part 64 of the cross-joint shape of this rotating body 62, and the drive unit 30 is restrained on the rise-and-fall base 21 in X1-X1 direction and all the directions of a Y1-Y 2-way. That is, the drive unit 30 is restrained so that it may not move in all the directions in the field of the drive chassis 31.

[0057]Here, as shown in drawing 6, as each projection 73 of the wall of the through hole 70 is shown in drawing 6, the surface is curved surface shape, and the tip part of each of said restrain part 64 and each projection 73 touch in point contact or the minimum area mostly by the position close to the bottom plate 21a of the rise-and-fall base. Therefore, it is possible to make the drive unit 30 incline a little to the rotating body 62, making the restriction means 60 into a restrained condition. Therefore, though said whole drive unit 30 inclines so that the end by the side of the 30 drive unit X2 may rotate in the direction of alpha by a waiting state as shown in drawing 4 (A), It inclines between the rotating body 62 and the through hole 70, power does not arise, and stress does not act on the drive chassis 31 or the resin chassis 72 of the drive unit 30, but the drive unit 30 is restrained certainly to a X1-X 2-way and a Y1-Y 2-way.

[0058]As shown in drawing 4 (A), the drive unit 30 is restrained by said restriction means 60 in the direction of X, and the direction of Y on the rise-and-fall base 21, and selection operation of the tray T in the magazine M is performed in the state where the clamping circuit 38 is rotating upwards further.

[0059]In this selection operation, the selection driving board 23 formed in the side of the case 10 shown in drawing 1 moves to a X1-X 2-way, and the rise-and-fall unit 20 is guided up and down by the selected holes 23a and 23a formed in the selection driving board 23. And after the rise-and-fall unit 20 has countered ahead of the tray T in the magazine M which should be chosen, the selection driving board 23 stops.

[0060]Next, 26 moves in the X1 direction from the end by the side of the transferring member X2 shown in drawing 2, and the selected tray T in the magazine M is pulled out by the hook 24 in the X1 direction from the inside of the magazine M. If the center of the disk D on the pulled-out tray T is in agreement with the center of the rotating table 33 on the drive unit 30, the clamp motion of a disk will be started, and the disk D will be

pinched and clamped by the rotating table 33 and the clamping circuit 38. If this clamp is completed, the transferring member 26 will move to X 2-way, and the empty tray T will be returned in the magazine M.

[0061]In said clamp motion, when the center of the disk D on the tray T pulled out out of the magazine M is in agreement with the rotating table 33, the cam gear 55 on the rise-and-fall base 21 rotates, the 1st switching member 44 moves to X 2-way, and 45 moves in the switching member of ** 2nd X1 direction. In the middle of this movement, it will be in the state of drawing 4 (B), and just before the guide pins 42 and the piece 31a of guidance of the drive chassis 31 escape from and come out from the restricted slots 51 and 52 and also the restricted slots 53 and 54, it results in the upheaval shaped part to the upper part of each of said restricted slots 51, 52, 53, and 54. At this time, the drive unit 30 is lifted a little from the state which shows in drawing 4 (A), and serves as a horizontal position.

[0062]The rotating table 33 fits in from a lower part to the center hole of the disk D on the tray T by the slight motion moving of this drive unit 30. The clamp cam 56 raises simultaneously and it separates from the pin 39, and the clamp arm 37 rotates according to the elastic force of the clamp spring 40, and the central part of the disk D on the pulled-out tray T is clamped by the rotating table 33 and the clamping circuit 38. The empty tray T is returned in the magazine M by the transferring member 26 immediately after this completion of a clamp as mentioned above.

[0063]When the restriction means 60 is a restrained condition, as shown in drawing 5 (A), the straight part 67a of the oblong hole 67 of the rotating body 62 has extended in parallel to the X1-X 2-way. Therefore, while the 1st switching member 44 moves to X 2-way from the position of drawing 4 (A) and resulting in the state of drawing 4 (B), the drive pin 68 provided in the 1st switching member 44 moves said straight part 67a to X 2-way. At this time, the rotating body 62 is not rotated but the drive unit 30 is restrained by this rotating body 62 to a X1-X 2-way and a Y1-Y 2-way.

[0064]And if the 1st switching member 44 moves to X 2-way further, it results in the state of drawing 4 (C) and 45 moves in the switching member of ** 2nd X1 direction similarly, the guide pins 42 and the piece 31a of guidance of the drive unit 30 will separate from each restricted slots 51, 52, 53, and 54.

[0065]While the 1st switching member 44 moves to the state of drawing 4 (C) from the state of drawing 4 (B), as shown in drawing 5 (B), the drive pin 68 provided in the 1st switching member 44 enters in the inflection part 67b of the oblong hole 67, and the rotating body 62 is rotated about 45 degrees to a counterclockwise rotation. At this time, each restrain part 64 of the rotating body 62 separates from the projection 73 of the wall

of the through hole 70 of the drive unit 30, and the restraint by the restriction means 60 is canceled.

[0066]Thus, where the disk D is clamped on the rotating table 33, the restraint of the drive unit 30 is canceled on the rise-and-fall base 21, and the drive unit 30 is elastically supported by the damper 25. In this state, the disk D rotates and record or playback is performed by the optical head 35.

[0067]If the drive of the disk D is completed, the tray T of the empty in the magazine M will be pulled out by the hook 24 of the transferring member 26 shown in drawing 2 on the drive unit 30, and the empty tray T will move to the disk D bottom clamped on the rotating table 33 by it. And the cam gear 55 on the rise-and-fall base 21 rotates, the 1st switching member 44 is moved in the X1 direction from the state of drawing 4 (C), and the 2nd switching member 45 is also moved to X 2-way at this time.

[0068]While the 1st switching member 44 moves to the position of drawing 4 (B) from the position of drawing 4 (C), the rotating body 62 is rotated from the state of drawing 5 (B) about 45 degrees to a clockwise rotation, and will be in the state of drawing 5 (A), and the drive unit 30 will be restrained by the rotating body 62 in the restriction means 60. Furthermore, very much, the clamping circuit 38 separates from the disk D in the state of drawing 4 (A), and the clamp of the disk D is canceled. And the transferring member 26 moves to X 2-way, and the tray T in which the disk D of which the clamp was canceled was laid is returned in the magazine M.

[0069]Next, the modification of said restriction means is explained. First, in the restriction means 60A shown in drawing 7, as shown in drawing 2 or drawing 5, the cross-joint-shaped rotating body 62 is used for the flat surface. However, the V type-like contact crevice 64a is formed in at least two of the four restrain parts 64 of the rotating body 62. The fitting contact part 74 is formed in the wall of the resin chassis 72 of the through hole 70 of the drive unit 30. When the rotating body 62 rotates to the state which shows in drawing 5 (A), while the drive unit 30 is restrained by each restrain part 64 of the rotating body 62 in all the directions of X1-X2 and Y1-Y2, said fitting contact part 74 enters in said contact crevice 64a by it. Thereby, the drive unit 30 is restrained also to the shaft orientations of the supporting spindle 61 of the rotating body 62. It is possible to restrain the drive unit 30 in the direction of a three dimension in this restriction means 60A.

[0070]In the restriction means 60B shown in drawing 8, the non-penetrating hollowed part 70A is formed in the drive unit 30, and the projection 73 is formed in the wall of this hollowed part 70A. The rotating body 62 provided in the rise-and-fall base 21 side is inserted into said hollowed part 70A, and serves as a non restraint position shown in

the restricted position shown in drawing 5 (A), and drawing 5 (B) by rotating within this hollowed part 70A.

[0071]In the restriction means 60C shown in drawing 9, the two through holes 70B and 70C are formed in the drive unit 30. In this case, one through hole 70C is a hole of the notch shape in which one side carried out the opening.

[0072]Each through hole 70B and the rotating bodies 62A and 62B which enter in 70C are formed in the rise-and-fall base 21 side. Drawing 9 shows the state where each rotating bodies 62A and 62B rotated in the restricted position. At this time, the both ends of the rotating body 62A are pressurized by the wall in which the through hole 70B counters, and it is restrained to X1 direction and X 2-way with which the drive unit 30 disagrees. The both ends of the rotating body 62B are simultaneously pressurized by the wall in which the through hole 70C counters, and it is restrained to Y1 direction and Y 2-way with which the drive unit 30 disagrees. Therefore, the drive unit 30 is restrained for [within a flat surface] all directions.

[0073]Rotation of each rotating bodies 62A and 62B about 90 degrees will cancel said restraint of said state.

[0074]In the restriction means 60D shown in drawing 10, the two through holes 70D and 70E are formed in the drive unit 30.

[0075]Each through hole 70D and the rotating bodies 62C and 62D which enter in 70E are formed in the rise-and-fall base 21 side. Drawing 10 shows the state where each rotating bodies 62C and 62D rotated in the restricted position. At this time, the end of the rotating body 62C is pressurized by the wall of each neighborhood of the through hole 70D, and the drive unit 30 is restrained in X 2-way and Y1 direction which intersect perpendicularly mutually. The end of the rotating body 62D is simultaneously pressurized by the wall of each neighborhood of the through hole 70E, and the drive unit 30 is restrained to X1 direction and Y 2-way which intersect perpendicularly mutually. Therefore, the drive unit 30 is restrained for [within a flat surface] all directions.

[0076]If said rotating bodies 62C and 62D move in about 45 degrees from the state of drawing 10, the restraint to said drive unit 30 will be canceled.

[0077]Contrary to each above-mentioned embodiment, a rotating body may be provided in the drive unit side, and the through hole or the hollowed part may be formed in the rise-and-fall base side.

[0078]This invention is feasible, even if it is not restricted to the disk unit of the disk case index loaded with a magazine but a disk is a disk unit etc. with which it is loaded one sheet at a time.

[0079]

[Effect of the Invention]As mentioned above, by this invention, the restriction means which restrains a drive unit can be constituted as a mechanism which does not project greatly to a way outside a drive unit, and a restriction means does not occupy the space around a drive unit widely. The structure which restrains a drive unit to multiple directions is also easily realizable by one restriction means.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The side view showing the embodiment of the disk unit of this invention,

[Drawing 2]The perspective view showing the rise-and-fall base which constitutes a rise-and-fall unit, and a drive unit,

[Drawing 3]The top view showing a drive unit,

[Drawing 4](A), (B), and (C) are the partial side views according to operation which shows the disk clamp in a drive unit, and releasing clamp operation,

[Drawing 5](A) and (B) are the part plans showing a restriction means according to operation,

[Drawing 6]The restrained condition of a restriction means is shown and it is a sectional view of the VI-VI line of drawing 3,

[Drawing 7]The sectional view showing the modification of a restriction means,

[Drawing 8]The sectional view showing the modification of a restriction means,

[Drawing 9]The top view of the drive unit in which the modification of a restriction means is shown,

[Drawing 10]The top view of the drive unit in which the modification of a restriction means is shown,

[Drawing 11](A) and (B) are the side views according to operation which shows the conventional disk unit,

[Description of Notations]

D Disk

T Tray

M Magazine

10 Case

20 Rise-and-fall unit

21 Rise-and-fall base

23 Selection driving board

24 Hook

25 Damper
26 Transferring member
30 Drive unit
31 Drive chassis
33 Rotating table
34 Spindle motor
35 Optical head
37 Clamp arm
38 Clamping circuit
39 Raise and it is a pin.
42 Guide pins
44 The 1st switching member
45 The 2nd switching member
51, 52, 53, and 54 Restricted slot
56 Clamp cam
60, 60A, 60B, 60C, and 60D Restriction means
62, 62A, 62B, 62C, and 62D Rotating body
64 Restrain part
70, 70B, 70C, 70D, and 70E Through hole
70A Hollowed part
73 Projection